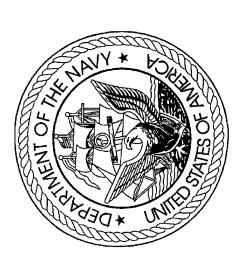
DEPARTMENT OF THE NAVY FISCAL YEAR (FY) 2001 BUDGET ESTIMATES



JUSTIFICATION OF ESTIMATES FEBRUARY 2000

RESEARCH, DEVELOPMENT, TEST & **BUDGET ACTIVITY 4** EVALUATION, NAVY

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Department of the Navy FY 2001 RDT&E Program

Exhibit R-1

				Thou	Thousands of Dollars	ars	
	Program Element		Budget				Security
Line Number	Number	Item Nomenclature	Activity	FY 1999	FY 2000	FY 2001	Classification
J	0603207N	Air/Ocean Tactical Application	4	26,702	29,942	30,337	5
J	3603216N		4	10,585	14,201	7,536	כ
٥	0603254N	ASW Systems Development	4	25,030	20,333	19,680	>
		(R2/R3 Materials provided in Classified Budget Book)					
J	3603261N	Tactical Airborne Reconnaissance	4	1,444	1,964	1,956	⊃
٠	D603382N	Advance Combat System Technology	4	6,438	6,790	6,943	Þ
_	0603502N	Surface & Shallow Water Mine Countermeasures	4	76,630	109,765	97,929	כ
٦	D603504N	Advance Submarine Combat Systems Dev	4	4,507	0	0	
		(R2/R3 Materials included in Classified Budget Book)					
_	0603506N	Surface Ship Torpedo Defense	4	4,840	4,614	0	⊃
_	3603512N	Carrier Systems Development	4	105,787	141,957	148,952	⊃
_	0603513N	Shipboard System Component Dev	4	98,980	113,474	244,437	n
_	0603525N	PILOT FISH	4	115,863	96,052	107,598	כ
		(Classified – Material Not Available)					
_	0603526N	Advanced Software and Computing Technology	4	0	994	0	ח
_	3603527N	RETRACT LARCH	4	0	7,791	11,895	n
		(Classified Material Not Available)					
_	0603536N	RETRACT JUNIPER	4	11,075	5,950	0	>
		(Classified Material Not Available)					
_	0603542N	Radiological Control	4	3,228	601	572	_
_	0603553N	Surface ASW	4	4,839	6,948	6,752	
_	0603559N	SSGN Conversion	4	0	0	34,762	⊃
_	0603561N	Advanced Submarine System Development	4	116,265	124,051	113,269	
_	D603562N	Submarine Tactical Warfare Sys	4	3,894	4,643	4,356	
	0603563N	Ship Concept Advanced Design	4	9,614	28,659	162	
	0603564N	Ship Preliminary Design & Feasibility Studies	4	90,4	11,945	46,896	
_	0603570N	Advanced Nuclear Power Systems	4	118,909	145,400	168,483	-
		(R2/R3 Materials included in Classified Budget Book)					
_	0603573N	Advanced Surface Machinery Systems	4	29,478	26,581	5,635	
_	0603576N	CHALK EAGLE	4	116,268	94,823	64,770	כ
		(Classified Material Not Available)					
_	0603582N	Combat System Integration	4	38,337	78,305	32,966	
_	N609E090	Conventional Munitions	4	37,105	39,087	28,619	כ
_	D603611M	Marine Corps Assault Vehicles	4	100,609	114,210	137,981	
_	0603612M		4	1,595	0	0	
	,						

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Department of the Navy FY 2001 RDT&E Program

Exhibit R-1

Research, Development, Test and Evaluation, N	APPROPRIATION: 1319n Research, Development, Test and Evaluation, Navy Thousands of Dollars
Research, Develor	1319n Research, Develor
	1319n

		:		Thousands of Dollars	sands of Doll	ars	
굓	Program Element		Budget				Security
Line Number	Number	Item Nomenclature	Activity	FY 1999	FY 2000	FY 2001	Classification
59	0603654N	Joint Service Explosive Ordnance Development	4	10,383	11,107	13,131	-
09	0603658N	Cooperative Engagement Capability	4	189,667	189,877	119,257	⊃
61	0603713N	Ocean Engineering Technology Development	4	14,073	16,712	15,371	כ
62	0603721N	Environmental Protection	4	70,414	82,999	62,194	Þ
63	0603724N	Navy Energy Program	4	4,520	6,945	4,942	
49	0603725N	_	4	1,835	1,974	1,824	⊃
65	0603734N	_	4	96,249	42,472	52,886	⊃
		(Classified Material Not Available)					
99	0603739N	Navy Logistic Productivity	4	2,905	17,902	0	⊃
		(Prior Year Only R2/R3 Not Required)					
29	0603746N	RETRACT MAPLE	4	113,896	121,543	125,222	⊃
		(Classified Material Not Available)					
89	0603748N	LINK PLUMERIA	4	22,024	47,988	42,372	⊃
		(Classified Material Not Available)					
69	0603751N	RETRACT ELM	4	22,791	19,427	13,541	כ
		(Classified - Material Not Available)					
02	0603755N	Ship Self Defense	4	15,757	8,607	6,610	-
71	0603764N	LINK EVERGREEN	4	0	7,836	9,712	D
		(Classified Material Not Available)					
72	0603787N	Special Processes	4	81,120	68,949	62,510	ס
		(Classified Material Not Available)					
73	0603790N	NATO Research and Development	4	9,665	5,431	8,992	⊃
74	0603795N	Land Attack Technology	4	83,761	116,839	143,044	ם
75	0603800N	Joint Advance Strike Technology Program - Dem/Val	4	471,362	239,907	131,566	⊃
92	0603851M	Nonlethal Weapons - Dem/Val	4	33,895	26,132	23,580	Þ
11	0603857N	All Service Combat ID Eval Team (ASCIET)	4	0	12,949	13,110	>
78	N6888090		ಶ	24,802	0	0	Þ
		(Prior Year Only R2/R3 Not Required)					
79	0604327N	Hard and Deeply Buried Target Defeat System	4	2,906	4,897	0	>
80	0604707N	SEW Architecture/Eng Support	4	22,579	36,904	34,100	>

2,424,303 2,366,852 2,229,666

Total Demonstration and Validation (Dem/Val)

Department of the Navy FY 2001 RDT&E Program

Exhibit R-1

DATE: February 2000 APPROPRIATION: 1319n Research, Development, Test and Evaluation, Navy

Classification Security _____ 2222 _ _ _ _ ココ \supset \supset 32,966 28,619 42,372 137,981 23,216 6,943 0 13,110 7,536 52,886 62,194 131,566 8,992 113,269 5,635 64,770 119,257 1,824 13,131 9,712 19,680 148,952 168,483 30,337 143,044 FY 2001 Thousands of Dollars 94,823 78,305 116,839 47,988 50,375 12,949 20,333 42,472 1,974 4,897 7,836 5,431 82,999 239,907 11,107 114,210 14,201 141,957 39,087 189,877 6,790 145,400 124,051 26,581 29,942 FY 2000 1,595 9,665 96,249 2,906 471,362 10,383 83,761 6,438 4,507 118,909 29,478 26,702 25,030 10,585 116,268 37,105 189,667 24,802 70,414 22,024 100,609 38,337 54,971 105,787 FY 1999 Activity Budget 4 4 (R2/R3 Materials provided in Classified Budget Book) Joint Advance Strike Technology Program - Dem/Val (R2/R3 Materials included in Classified Budget Book) Marine Corps Mine/Countermeasures Systems - Adv Advanced Software and Computing Technology Joint Service Explosive Ordnance Development Marine Corps Ground Combat/Support System Hard and Deeply Buried Target Defeat System All Service Combat ID Eval Team (ASCIET) 0603561N Advanced Submarine System Development 3603504N Advance Submarine Combat Systems Dev (Prior Year Only -- R2/R3 Not Required) Advanced Surface Machinery Systems 3603382N Advance Combat System Technology Classified -- Material Not Available) (Classified -- Material Not Available) Cooperative Engagement Capability (Classified - Material Not Available) (Classified -- Material Not Available) NATO Research and Development 3603570N Advanced Nuclear Power Systems Marine Corps Assault Vehicles Carrier Systems Development Air/Ocean Tactical Application ASW Systems Development Combat System Integration **Environmental Protection** Land Attack Technology Conventional Munitions Facilities Improvement Counterdrug RDT&E Aviation Survivability LINK EVERGREEN Number Item Nomenclature **LINK PLUMERIA** CHALK CORAL CHALK EAGLE 0603790N 0603573N 0603207N 0603734N 3603764N 0603612M 0603526N 0603857N 0603254N 0603512N N609E090 0603658N 0603721N 0603725N 0604327N 0603800N 0603654N 0603795N 0603748N 0603611M 0603635M 0603582N N6888090 0603216N 0603576N Element Line Number 52 30 77 32 31 23 85 55 87 78 60 87 62 64 75 75 75 77 77 89 56 57 73 38 47

Department of the Navy FY 2001 RDT&E Program

Exhibit R-1

DATE: February 2000

APPROPRIATION: 1319n Research, Development, Test and Evaluation, Navy

Classification Security 4,942 15,371 107,598 11,895 46,896 6,610 244,437 62,510 34,762 4,356 97,929 23,580 13,541 34,100 162 572 FY 2001 125,222 Thousands of Dollars 8,607 113,474 68,949 6,945 17,902 16,712 96,052 36,904 28,659 11,945 4,643 109,765 6,948 4,614 1,964 26,132 5,950 7,791 19,427 60 FY 2000 121,543 11,075 6,706 15,757 98,980 33,895 14,073 115,863 76,630 4,839 4,520 2,905 3,228 22,791 9,614 81,120 3,894 4,840 1,444 FY 1999 113,896 Activity Budget Surface & Shallow Water Mine Countermeasures Ocean Engineering Technology Development Ship Preliminary Design & Feasibility Studies (Prior Year Only -- R2/R3 Not Required) (Classified -- Material Not Available) (Classified -- Material Not Available) (Classified -- Material Not Available) (Classified – Material Not Available) (Classified -- Material Not Available) Shipboard System Component Dev 0603261N Tactical Airborne Reconnaissance Submarine Tactical Warfare Sys Ship Concept Advanced Design SEW Architecture/Eng Support Surface Ship Torpedo Defense Nonlethal Weapons - Dem/Val Navy Logistic Productivity 0603724N Navy Energy Program RETRACT JUNIPER Radiological Control RETRACT LARCH RETRACT MAPLE Number Item Nomenclature SSGN Conversion Ship Self Defense Special Processes RETRACT ELM Surface ASW PILOT FISH 0603851M 0603713N 0603506N 0603739N 0603525N 0603542N 0603751N 0603527N 0603563N 0603564N 0603755N 0603513N 0603787N 0603559N 0603562N 0603502N 0603553N 0603536N 0603746N 0604707N Element Line Number 6 5 4 5 6 4 8 43 80 33 33 34 34 35 33 34 35 63 42 67

2,229,666

2,366,852

2,424,303

Total Demonstration and Validation (Dem/Val)

Comparison of FY 1999 Financing as reflected in FY 2000 Budget with 1999 Financing as Shown in the FY 2001 Budget

(\$ In Thousands)

FY 2000 Budget FY 2001 Budget Decrease (+) or	8,942,170	212,229	9,154,399
	Program Requirements (Service Account)	Program Requirements (Reimbursable)	Appropriation (Adjusted)

Explanation of Changes in Financing (\$ in Thousands)

The Fiscal Year 1999 program has changed since the presentation of the FY 2000 budget as noted below:

- 1. Program Requirements (Total). There has been a net increase to the appropriation (adjusted) of +\$281,361 as a result of changes in program requirements as noted below.
- JTCTS (+\$6,000), Combat Systems Integration (+\$18,000), Ship Self Defense (+\$4,000), and various classified programs 2. Program Requirements (Service Account). There has been a net increase to the appropriation (adjusted) of \$281,361 specifically section 8058 (-\$14,900) and section 8090 (-\$40,900). Other changes are a result of reprogrammings which require congressional prior approval, including CH-60 (+\$4,000), OSCAR (+\$9,615), LASM (+\$6,900), ESSM (-\$22,672), (+\$275,000). Other transfers into or out of the account resulted in changes (-\$4,484). Internal realignments for Counter which is a result of various changes. These changes include rescissions in the FY 2000 DoD Appropriations Act. errorism (+\$8,000) and Counterdrug Operations (+\$32,802) are also included.
- Program Requirements (Reimbursable). There has been a net increase to the appropriation of \$62,229, as a result of changes in reimbursable program requirements.

Comparison of FY 1999 Program Requirements as reflected in the FY 2000 Budget with FY 1999 Program Requirements as shown in the FY 2001 Budget

Summary of Requirements (\$ in Thousands)

	Total Program	Total Program	
	Requirements per FY 2000	Requirements per FY 2001	Increase (+) or
	Budget	Budget	Decrease (-)
01 – Basic Research	361,499	354,017	-7,482
02 – Applied Research	566,801	550,569	-16,232
03 - Advanced Technology Development	593,176	569,903	-23,273
04 - Demonstration and Validation (DEM/VAL)	2,408,520	2,427,114	+18,594
05 – Engineering and Manufacturing Development	2,199,737	2,134,903	- 64,,834
(EME) 06 – RDTE Management Support	598,664	726,989	+128,325
07 - Operational Systems Development	1,932,412	2,178,675	+246,263
Total Fiscal Year Program	8,660,809	8,942,170	+281,361

Explanation by Budget Activity (\$ in Thousands)

- Innovative Research (SBIR) program (-\$5,782), rescissions reflected in the FY 2000 DoD Appropriation Act (-\$1,642) and 01. Basic Research (-\$7,482) Changes to this budget activity resulted from a transfer to support the Small Business other changes in program requirements which required minor reprogrammings (-\$58).
- Appropriation Act (-\$2,581) and other changes in program requirements which required minor reprogrammings (-\$6,436). 02. Applied Research (-\$16,232) Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-\$7,215). Other changes included rescissions reflected in the FY 00 DoD

- 03. Advanced Technology Development (-\$23,273) Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-\$8,363). These changes included rescissions reflected in the FY 2000 DoD Appropriation Act (-\$2,600), a transfer to Defense-wide R&D for USACOM Joint Experimentation (-\$15,900) other changes in program requirements which required minor reprogrammings (+\$3,590).
- program (+\$24,802), change in program requirements (+\$7,461), FY 2000 DoD Appropriation Act rescissions (-\$14,946) 04. Demonstration and Validation (DEM/VAL) (+\$18,594) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (-\$32,812), transfers to support the Counter Drug and other changes in program requirements which required minor reprogrammings (+\$34,089)
- Work/TOC initiatives (+\$1,554), an adjustment realigning COSSI funds from BA-5 to BA-7 (-\$15,208), OSCAR (+\$9,615), transfer to support the Small Business Innovative Research (SBIR) program (-\$52,462), transfers to support the Smart 05. Engineering and Manufacturing Development (EMD) (-\$64,834) Changes to this budget activity resulted from a program requirements which required minor reprogrammings, budget activity realignments and accounting updates CH-60 reprogramming (+\$4,000), a FY 2000 DoD Appropriation Act rescissions (-\$10,162), and other changes in
- (-\$2,709), other changes in program requirements which required minor reprogrammings, budget activity realignments 06. RDTE Management Support (+\$128,325) - Changes to this budget activity resulted from a transfer to support the Small Business Innovative Research (SBIR) program (+\$121,893), a FY 2000 DoD Appropriation Act rescissions and accounting updates (+\$5,747) and a transfer for Federal Technology (+\$2,945).
- 07. Operational Systems Development (-\$246,263) Changes to this budget activity resulted from a transfer to support requirements which required minor reprogrammings, budget activity realignments and accounting updates (-\$1,576). programs (+\$275,000), the Counter-Terrorism Supplemental (+\$8,000) and JTCTS (+\$6,000). These changes also the Small Business Innovative Research (SBIR) program (-\$23,153), an internal reprogramming into the classified included rescissions reflected in the FY 2000 DoD Appropriations Act (-\$21,160), and other changes in program

Comparison of FY 2000 Financing as reflected in FY 2000 Budget with 2000 Financing as Shown in the FY 2001 Budget

(\$ In Thousands)

	Financing per	Financing Fer	Increase (+) or
	FY 2000 Budget	FY 2001 Budget	<u> Necrease (-)</u>
Program Requirements (Service Account)	7,984,016	9,056,644	+1,072,628
Program Requirements (Reimbursable)	150,000	198,500	+48,500
Appropriation (Adjusted)	8,134,016	9,255,144	+1,121,128

Explanation of Changes in Financing (\$ in Thousands)

The Fiscal Year 2000 program has changed since the presentation of the FY 2001 budget as noted below:

- 1. Program Requirements (Total). There has been a net increase to the appropriation (adjusted) of +\$1,072,628, result of changes in program requirements as noted below.
- Also, other changes in program requirements, phasing, or pricing Appropriations Act (-\$46,821) and specific FY 2000 Congressional adjustments to start, continue, discontinue, reduce or Experimentation program (+\$1,900), which is managed by the Navy as DoD executive agent, and a transfer to Defenseactions which require congressional prior approval are also included, such as a transfer of funds for the USACOM Joint earmark 205 specific initiatives (including transfers, which resulted in a net increase of \$1,126,310). Reprogramming Wide Chemical/Biological (Chem/Bio) (-\$18,200). Internal reprogrammings actions impacting the FY 2000 program 2. Program Requirements (Service Account). There has been a net increase to the appropriation (adjusted) of \$1,072,628, as a result of various changes. These changes included rescissions reflected in the FY 2000 DoD include Electronic Warfare Development (+\$10,000). resulted in transfers into or out of the account (-\$561).
- 3. Program Requirements (Reimbursable). There has been a net increase to the appropriation of +\$48,500, as a result of changes in reimbursable program requirements (+\$48,500)

Comparison of FY 2000 Program Requirements as reflected in the FY 2000 Budget with FY 2000 Program Requirements as shown in the FY 2001 Budget

Summary of Requirements (\$ in Thousands)

Total Program

Total Program

	Requirements per FY 2000	Requirements per FY 2001	Increase (+) or
	Budget	Budget	Decrease (-)
01 – Basic Research	376,748	374,301	-2,447
02 – Applied Research	523,839	622,394	+98,555
03 - Advanced Technology Development	519,523	753,631	+234,108
04 – Demonstration and Validation (DEM/VAL)	2,086,062	2,366,852	+280,790
05 – Engineering and Manufacturing Development	1,953,882	2,301,795	+347,913
06 – RDTE Management Support	646,489	641,017	-5,472
07 - Operational Systems Development	1,877,473	1,996,654	+119,181
Total Fiscal Year Program	7,984,016	9,056,644	+1,072,628

Explanation by Budget Activity (\$ in Thousands)

- 01. Basic Research (-\$2,447) Changes to this budget activity resulted from the rescissions found in the FY 2000 DoD Appropriations Act (-\$2,447).
- continue, discontinue, reduce or earmark 35 specific initiatives (including transfers) which resulted in a net increase (+\$102,010). Additionally, this change reflects rescissions found in the FY 2000 Appropriations Act (-\$3,455). 02. Applied Research (+\$98,555) - These changes included specific FY 2000 Congressional adjustments to start,

- adjustments to start, continue, discontinue, reduce or earmark 14 specific resulting initiatives (including transfers), which resulted in a net increase (+\$235,400), as well as the rescissions reflected in the FY 2000 Appropriations Act (-\$4,194). Additionally, FY 2000 includes a transfer for the USACOM Joint Experiments program (+\$1,900) and other changes in 03. Advanced Technology Development (+\$234,108) - These changes included specific FY 2000 Congressional program requirements which required minor reprogrammings (+\$1,002).
- adjustments to start, continue, discontinue, reduce or earmark 49 specific initiatives (including transfers), which resulted in 04. Demonstration and Validation (DEM/VAL) (+\$280,790) - These changes included specific FY 2000 Congressional Additionally, FY 2000 includes changes in program requirements which required minor reprogrammings (+\$5,331). a net increase (+\$287,300) as well as the rescissions reflected in the FY 2000 Appropriations Act (-\$11,841)
- (-\$11,910). Additionally, changes in program requirements which required minor reprogrammings are reflected (-\$7,316). Congressional adjustments to start, continue, discontinue, reduce or earmark 40 specific initiatives (including transfers), 05. Engineering and Manufacturing Development (EMD) (+\$347,913) - These changes included specific FY 2000 which resulted in a net increase of (+\$367,139), as well as rescissions reflected in the FY 2000 Appropriations Act
- continue, discontinue, reduce or earmark 13 specific initiatives (including transfers), which resulted in a net increase of (+\$24,300), as well as rescissions reflected in the FY 2000 Appropriations Act (-\$1,784). Other decreases included a 06. Management Support (-\$5,472) - These changes included specific FY 2000 Congressional adjustments to start, transfer to Defense-wide Chem/Bio (-\$18,200) and changes in program requirements which required minor reprogrammings (-\$9,788)
- adjustments to start, continue, discontinue, reduce or earmark 28 specific resulting initiatives (including transfers), which resulted in a net increase (+\$131,200), as well as rescissions reflected in the FY 2000 Appropriations Act (-\$11,190). 07. Operational Systems Development (+\$119,181) - These changes included specific FY 2000 Congressional Additionally, changes in program requirements which required minor reprogrammings (-\$829).

EXHIBIT R-2, FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION

Date: February 2000

PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications

(U) COST: (Dollars in Thousands)

BUDGET ACTIVITY: 4

PROJECT NUMBER & Title	3	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
X2341	METOC Data Acquisition									
		7,264	8,621	8,756	9,019	10,186	10,398	10,647	CONT.	CONT
X2342	METOC Data Assimilation and Modeling	n and Mode	ling							
		11,068	12,221	12,295	13,203	12,659	12,955	13,292	CONT.	CONT.
X2343	X2343 Tactical METOC Applications	tions								
		6,963	7,664	7,827	7,950	8,442	8,636	8,803	CONT.	CONT.
X2344	Precise Timing and Astrometry	rometry								
		1,404	1,436	1,459	1,480	1,506	1,536	1,568	CONT.	CONT.
TOTAL		26,699	29,942	30,337	31,652	32,793	33,525	34,310	CONT.	CONT.

R-1 Shopping List - Item No 30 (1) of 30 (27)

Exhibit R-2, RDT&E Budget Item Justification

EXHIBIT R-2, FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION

Date: February 2000

0603207N

BUDGET ACTIVITY: 4

Air/Ocean Tactical Applications PROGRAM ELEMENT TITLE:

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

incorporated into fleet trainers to provide realistic environments in support of warfare simulations. Finally, this project knowledge and improve understanding of the meteorological and oceanographic (METOC) environment and its impact on combat systems performance. AOTA focuses on shallow water and other harsh environments, and regional conflict and crisis response scenarios. Projects in this program element develop atmospheric and oceanographic data assimilation techniques, forecast models, data base management systems and associated software for use in both mainframe and tactical scale computers. Global measurement techniques, new sensors, communications and interfaces. Included are techniques to assess, predict and enhance Also developed are algorithms to process remotely sensed satellite data for integration into other systems and tactical applications. In addition, the projects provide for demonstration and validation of specialized METOC instrumentation and eospatial Information and Services efforts within this program address the bathymetric and gravimetric needs of the Navy. These METOC products will also be the performance of current and proposed undersea surveillance, tactical and mine warfare and weapons systems. AOTA METOC The Air Ocean Tactical Applications (AOTA) Program Element is specifically tailored to emphasize techniques which expand products are tailored for, and will be incorporated into the Global Command and Control System/Maritime (GCCS/M) and/or upgrades the accuracy of the U.S. Naval Observatory's Master Clock system; develops near-real-time earth orientation predictions; develops very precise determination of positions of both faint and bright stars; and supports satellite onboard combat systems to provide accurate operational system performance predictions. tracking and space debris studies.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates systems for experimental test related to specific ship or aircraft applications.

R-1 Shopping List - Item No 30 (2) of 30 (27)

Exhibit R-2, RDT&E Budget Item Justification

EXHIBIT R-2a, FY 2001 RDT&E,N PROJECT JUSTIFICATION

PROJECT NUMBER: X2341 Air/Ocean Tactical Applications 0603207N PROGRAM ELEMENT TITLE: PROGRAM BUDGET ACTIVITY: 4

METOC Data PROJECT TITLE:

Date: February 2000

Program Total Estimate Complete FY 2005 Estimate FY 2004 Estimate FY 2003 Estimate FY 2002 Estimate FY 2001 Estimate FY 2000 FY 1999 Actual

Acquisition

METOC Data Acquisition X2341

NUMBER &

Title

CONT. 10,647 10,398 10,186 9,019 8,621

evolved. The littoral and hinterland regions are extremely dynamic and complex, characterized by strong and highly variable oceanographic and atmospheric conditions. As a result, the need to accurately characterize these parameters is more crucial than ever in planning and executing Amphibious Warfare, Mine Warfare, Special Operations, Anti-Submarine Warfare, and Strike Warfare operations. Routinely available data sources, such as climatology, oceanographic and meteorological numerical remote or inaccessible areas over extended periods of time. The principal goals of this project are to: 1) Provide the means to rapidly and automatically acquire a broad array of METOC data using both off-board and on-board sensors; 2) provide (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The major thrust of the meteorology and oceanography (METOC) Data techniques which employ data compression, connectivity and interface technologies to ingest, store, process, distribute and ability to provide timely and accurate METOC data and products to the Tactical Commander. As the emphasis on Naval Warfare has evolved from blue water operations to the littoral and hinterland battlespace, METOC data requirements have likewise an on-scene assessment capability for the tactical commander; 3) provide the tactical commander with real-time METOC data and products for operational use; 4) demonstrate and validate the use of tactical workstations and desktop computers for models, and satellite remote sensing are inadequate to support these warfare areas in the littoral and hinterland regions. display these METOC data and products; 6) develop new charting and bathymetric survey techniques necessary to reduce the Acquisition Project is to develop, demonstrate, and validate METOC data collection methods and sensors, and to evolve the frequently located great distances from the area of interest. The principal challenge is to provide a means for the collection and dissemination of METOC data in highly variable and dynamic littoral environmental conditions or in denied, 7) develop an expanded database for Current operational sensors, such as the standard balloon launched radiosonde, are deployed from platforms which are processing and display of METOC data and products using latest networking technologies; 5) demonstrate and validate existing 300 ship year shortfall in coastal hydrographic survey requirements; and, predictive METOC models in areas of potential interest.

R-1 Shopping List - Item No 30 (3) of 30 (27)

Exhibit R-2a, RDT&E,N PROJECT JUSTIFICATION (X2341)

EXHIBIT R-2a, FY 2001 RDT&E,N PROJECT JUSTIFICATION

PROGRAM ELEMENT: 0603207N

Air/Ocean Tactical Applications PROGRAM ELEMENT TITLE:

PROJECT NUMBER: X2341
PROJECT TITLE: METOC Data
Acquisition

Date: February 2000

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

4

BUDGET ACTIVITY:

1. (U) FY 1999 ACCOMPLISHMENTS:

- (U) (\$1,244) Continued Integration of MEASURE Interface Processor (MIP) into airborne unmanned vehicles (UAV's). Continued development of Battlespace characterization techniques to measure environmental data in-situ and transmit to Fleet assets.
- (\$700) Completed Airborne Combat Data Collection via fleet assets.
- (U) (\$750) Continued sensor developments for ROV/AUV, and initiate sensor integration and development of UAV sensors in Tier II Plus Vehicles.
- (U) (\$300) Completed hinterland clandestine micro sensors.
- (U) (\$845) Continued assessments of temporal and spatial variability of littoral environments for acoustic data inversion.
- (U) (\$700) Continued dem/val of METOC Air, Surface, Undersea Reconnaissance Equipment (MEASURE), and continued development of next-generation sensors for Moriah.
- (U) (\$650) Completed data connectivity with the Aegis C2 system and the Mine Countermeasures mission planning system. Continued development of data connectivity with the next generation Tomahawk mission planning system and the Global Command and Control System/Maritime (GCCS/M).
- (\$375) Continued development of advanced aerosol measurement techniques Ð)
- (U) (\$450) Continued instrumentation demonstration and validation of joint RMS vehicle for remote littoral bathymetry/mine hunting.

R-1 Shopping List - Item No 30 (4) of 30 (27)

Exhibit R-2a, RDT&E,N PROJECT JUSTIFICATION (X2341)

EXHIBIT R-2a, FY 2001 RDT&E,N PROJECT JUSTIFICATION

Air/Ocean Tactical Applications 0603207N

PROGRAM ELEMENT TITLE: ELEMENT:

PROGRAM

BUDGET ACTIVITY: 4

Acquisition METOC Data X2341 PROJECT NUMBER: PROJECT TITLE:

Date: February 2000

(U) (\$400) Completed development of airborne laser bathymetry techniques from fixed wing aircraft for crisis response.

(\$850) Continued information management and DMAP functions Ð

(U) FY 2000 PLAN: 7

- Complete Integration of MEASURE Interface Processor (MIP) into airborne unmanned vehicles (UAV's). Continue development of Battlespace characterization techniques to measure environmental data in-situ and transmit to Fleet assets. (\$1,381)
- (\$1,300) Continue sensor developments for ROV/AUV, and continue sensor integration and development of UAV sensors in Tier II Plus Vehicles. Ð
- (\$1,050) Continue assessments of temporal and spatial variability of littoral environments for acoustic (U) (\$1,050) Co data inversion.
- (U) (\$920) Begin development of advanced techniques to acquire and manage ambient noise data.
- (U) (\$1,100) Continue development of next-generation sensors for MEASURE, Moriah and aerosol measurements
- (\$1,245) Continue development of data connectivity with the next generation Tomahawk mission planning Begin development of data connectivity with the next generation Tactical Air Mission Planning System (TAMPS 7.0) system and GCCS/M.
- (U) (\$775) Complete instrumentation demonstration and validation of joint RMS vehicle for remote littoral bathymetry/mine hunting.

R-1 Shopping List - Item No 30 (5) of 30 (27)

Exhibit R-2a, RDT&E,N PROJECT JUSTIFICATION (X2341)

EXHIBIT R-2a, FY 2001 RDT&E,N PROJECT JUSTIFICATION

PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications

BUDGET ACTIVITY: 4

PROJECT NUMBER: X2341
PROJECT TITLE: METOC Data
Acquisition

Date: February 2000

(U) (\$850) Continue information management and DMAP functions.

3. (U) FY 2001 PLAN:

- (U) (\$1,275) Complete sensor developments for ROV/AUV, and continue sensor integration and development of UAV sensors in Tier II Plus Vehicles.
- (U) (\$1,175) Continue assessments of temporal and spatial variability of littoral environments for acoustic data inversion.
- (U) (\$1,385) Continue development of advanced techniques to acquire and manage ambient noise data.
- (U) (\$1,175) Complete development of next-generation sensors for MEASURE, MORIAH and aerosol measurements.
- (U) (\$1,175) Complete development of data connectivity with the next generation Tomahawk mission planning system. Continue development of data connectivity with the next generation Tactical Air Mission Planning System (TAMPS 7.0) and GCCS/M.
- (U) (\$1,621) Begin development of next-generation acoustic data acquisition techniques
- (U) (\$950) Continue information management and DMAP functions.

R-1 Shopping List - Item No 30 (6) of 30 (27)

Exhibit R-2a, RDT&E,N PROJECT JUSTIFICATION (X2341)

EXHIBIT R-2a, FY 2001 RDT&E,N PROJECT JUSTIFICATION

PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications

PROJECT NUMBER: X2341
PROJECT TITLE: METOC Data
Acquisition

Date: February 2000

B. (U) PROGRAM CHANGE SUMMARY:

BUDGET ACTIVITY: 4

FY 2000 Reflects Congressional adjustments (-48) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638 (183); FY 2001 Miscellaneous Departmental adjustments U) Funding: FY 1999 Reflects congressional reductions associated with Economic Assumptions (-35), Small Business Innovation Research assessment (-104); LOCO GPSI Support (-65); and Miscellaneous Departmental Adjustments (-49) (U) Funding: (-136).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY:

U) RELATED RDT&E: PE 0604218N, Air/Ocean Equipment Engineering - AN/SMQ-11 satellite receiver/recorder system engineering to receive data from DMSP onboard selected ships and shore sites. (U) RELATED RDT&E:

(U) ACQUISITION STRATEGY: Not applicable

R-1 Shopping List - Item No 30 (7) of 30 (27)

Exhibit R-2a, RDI&E,N PROJECT JUSTIFICATION (X2341)

Exhibit R-3 Project Cost Analysis	- 1	(page 1)						Date: F	FEB 00			
APPROPRIATION/BUDGET ACTIVITY:	1~		PROGRAM ELEMENT:		0603207N			PROJECT N	PROJECT NAME AND NUMBER:	1	X2341 METOC DATA ACOUISITION	NOITISI
Cost Categories	Contract Method & Type	Performing Activity & Location	Total FY98+ PY Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total	Target Value of Contrac
Product Development	WX	NRL NAWC-AD Lake	0 0	2,976	N/A N/A	4,008	N/A N/A	4,072	N/A N/A	CONT	CONT	
	CP	SSA	0	1,500	N/A	1,500	N/A	1,525	N/A	CONT	CONT	
	N/A	MISC	0	1,585	N/A	2,473	N/A	2,609	N/A	CONT	CONT	
Subtotal Product Development			0	6,739	NA	8,081	NA	8,206	N/A	CONT	CONT	
Remarks:					:							
Support	CB	SSA	0	525	N/A	540	N/A	550	N/A	CONT	CONT	
Subtotal Support			0	525	N/A	540	N/A	550	N/A	CONT	CONT	
rdilatro												

R-1 Shopping List - Item No 30 (8) of 30 (27)

Exhibit R-3, Project Cost Analysis

Exhibit R-3 Project Cost	Cost Analysis	(page 2)						Date: F	FEB 00			
APPROPRIATION/BUDGET ACTIVITY:	ITY: RDT&E, N/BA5	N/BA5	PROGRAM ELEMENT:	T: 0603207N	N L 0			PROJECT N	PROJECT NAME AND NUMBER:	UMBER: X2341 METOC D	X2341 METOC DATA ACQUISITION	ISITION
Cost Categories	Contrac t Method & Type	Performing Activity & Location	Total FY98+ PY Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total	Target Value of Contrac
Subtotal T&E												
Remarks												
Subtotal Management												
Remarks												
Total Cost Remarks			0	7,264	N/A	8,621	N/A	8,756	N/A	CONT	CONT	

R-1 Shopping List - Item No 30 (9) of 30 (27)

Exhibit R-3, Project Cost Analysis

EXHIBIT R-2a, FY 2001 RDT&E,N PROJECT JUSTIFICATION

METOC Data Assimilation X2342 PROJECT NUMBER: PROJECT TITLE: Air/Ocean Tactical Applications 0603207N PROGRAM ELEMENT TITLE: PROGRAM ELEMENT:

TITLE: METOC Data Assim: and Modeling

Date: February 2000

(U) COST (Dollars in thousands)

BUDGET ACTIVITY: 4

Program Total Complete Estimate FY 2005 Estimate FY 2004 Estimate FY 2003 Estimate FY 2002 Estimate FY 2001 Estimate FY 2000 Actual FY 1999 NUMBER & PROJECT Title

X2342 METOC Data Assimilation and Modeling.

13,292 12,955 12,659 13,203 12,295 12,221 11,068

oceanographic data assimilation techniques, forecast models, database management systems, and associated software for use in worldwide in virtually every mission area; 2) other models, which focus on ocean thermal structure and circulation, and surf Centers ashore and on ships equipped with the AN/SMQ-11 satellite receiver/recorder. These techniques allow for the integration and tactical application of significant oceanographic and atmospheric data derived from satellite-borne sensors. geophysical information, analysis schemes encompassing Artificial Intelligence and Expert Systems, and other satellite data increasingly significant impact on system performance. Operational limitations induced by the ocean and atmosphere must be Hence, the operating Scale Computers at the Navy Fleet Numerical Meteorology and Oceanography Center, Monterey, CA and the Naval Oceanographic Office, Stennis Space Center, MS. These models, combined with a global communications network for data acquisition and (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The meteorological and oceanographic (METOC) Data Assimilation applications and field validation of end products; and, 4) a family of acoustic system performance models beginning with forces require more accurate worldwide forecasts of METOC conditions with increased temporal and spatial resolution. An both mainframe and tactical scale computers. Included are numerical oceanographic and atmospheric models for the Large disparate data types. In order to fully exploit this dynamic and massive volume of data, modern data base management systems (DBMS) are required, and must be tailored for individual computer configurations. Improved representation of and tide prediction; 3) techniques to process and manage satellite remotely-sensed environmental data at Oceanography additional challenge is posed by the emergence of new satellite sensors, which are continually adding new sources of distribution, form a prediction system which provides METOC data and products necessary to support naval operations active system models and databases in the low-, mid-, and high-frequency regimes and culminating with high fidelity Included are techniques and algorithms for the processing of sensor measurements, conversion of raw signal data to Project is a multi-faceted program which includes: 1) development, demonstration and validation of atmospheric and simulation products. As weapons and sensors become more sophisticated and complex, the marine environment has an understood, and the resulting constraints on mission effectiveness and system employment minimized. smaller-scale phenomena, particularly in the littoral, is also an important consideration.

R-1 Shopping List - Item No 30 (10) of 30 (27)

Exhibit R-2a, RDT&E Project Justification (X2342)

EXHIBIT R-2a, FY 2001 RDT&E,N PROJECT JUSTIFICATION

X2342 NUMBER: PROJECT TITLE: PROJECT Air/Ocean Tactical Applications 0603207N PROGRAM ELEMENT: PROGRAM ELEMENT TITLE:

lications PROJECT TITLE: METOC Data Assimilation and Modeling

Date: February 2000

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

4

BUDGET ACTIVITY:

1. (U) FY 1999 ACCOMPLISHMENTS:

- Continued modeling and simulation of atmosphere and ocean environmental effects on Navy systems. (n) (\$950)
- Completed development of advanced aerosol model and began dem/val of techniques for coupled air/ocean data assimilation. (L) (\$1,067)
- Participated in selected fleet exercises and demonstrations. (U) (\$400)
- Continued development of MPP version of NOGAPS and the shipboard version of tactical scale nested model for operational use.
- Continued development of next-generation tropical cyclone forecast model and the Arabian Gulf/Arabian ocean model.
- (U) (\$700) Continued development of capabilities to assimilate and quality control METOC data from satellite sensors and conventional data sources using 4D variational techniques.
- Completed development of SSM/IS atmospheric algorithms and transition of new algorithms for SAR and altimetry data.
- (U) (\$250) Completed evaluation of aviation impact variables satellite product.
- (U) (\$1,150) Began development of techniques for bathymetry and surf zone and high resolution microtopography algorithms and automated objective processing in the littoral
- (U) (\$700) Continued development of coastal and enclosed basin tactical scale oceanographic models for selected geographical locations in response to emergent requirements.

R-1 Shopping List - Item No 30 (11) of 30 (27)

Exhibit R-2a, RDT&E Project Justification (X2342)

EXHIBIT R-2a, FY 2001 RDT&E,N PROJECT JUSTIFICATION

Date: February 2000

and Modeling

METOC Data Assimilation X2342 NUMBER: PROJECT TITLE: PROJECT Air/Ocean Tactical Applications 0603207N PROGRAM ELEMENT TITLE: ELEMENT:

4

BUDGET ACTIVITY:

(\$550) Continued development of a shipboard shallow water ocean circulation model and an automated graphical application for tactical data visualization. Ð

- (U) (\$650) Began development of next generation tide and surf models
- (U) (\$1,100) Continued the development of mid-frequency bottom loss/bottom scatter models and databases for shallow water environments.
- (U) (\$748) Continued the verification and validation of products and data assimilation techniques developed for fleet applications.

2. (U) FY 2000 PLAN:

- Continue modeling and simulation of atmosphere and ocean environmental effects on Navy systems. (U) (\$1,278)
- Continue developments of techniques for coupled air/ocean data assimilation. (\$1,233)Ð
- Participate in selected fleet exercises and demonstrations. (\$400) Ð
- Complete development of MPP version of NOGAPS and the shipboard version of tactical scale nested model for operational use. (U) (\$925)
- (U) (\$1,385) Begin development of next generation high resolution coupled air/ocean forecast models
- Gulf/Arabian ocean model. Continue development of coastal and enclosed basin tactical scale oceanographic and the Arabian Complete development of next-generation tropical cyclone forecast model models for selected geographical locations in response to emergent requirements. (\$1,460)
- (U) (\$1,165) Continue development of capabilities to assimilate and quality control METOC data from satellite sensors and conventional data sources using 4D variational techniques.

R-1 Shopping List - Item No 30 (12) of 30 (27)

Exhibit R-2a, RDT&E Project Justification (X2342)

EXHIBIT R-2a, FY 2001 RDT&E,N PROJECT JUSTIFICATION

Date: February 2000

4

BUDGET ACTIVITY:

METOC Data Assimilation and Modeling X2342 NUMBER: PROJECT TITLE: PROJECT Air/Ocean Tactical Applications 0603207N PROGRAM ELEMENT: PROGRAM ELEMENT TITLE:

(U) (\$1,250) Continue development of techniques for bathymetry and surf zone and high resolution micro-topography algorithms and automated objective processing in the littoral.

- and (U) (\$1,285) Continue development of shipboard shallow water ocean circulation model, next generation tide surf models, and automated graphical applications for tactical data visualization.
- Continue the development of mid-frequency bottom loss/bottom scatter models and databases for shallow water environments. (U) (\$1,025)
- Continue the verification and validation of products and data assimilation techniques developed for fleet applications. (U) (\$815)

3. (U) FY 2001 PLAN:

- Continue modeling and simulation of atmosphere and ocean environmental effects on Navy systems. (U) (\$1,288)
- Begin development of Complete developments of techniques for coupled air/ocean data assimilation. variational techniques for coupled assimilation. (U) (\$1,459)
- Participate in selected fleet exercises and demonstrations. (D) (\$579) •
- (\$1,253) Continue development of next generation high resolution coupled air/ocean forecast models. Ð
- (U) (\$1,250) Continue development of coastal and enclosed basin tactical scale oceanographic models for selected geographical locations in response to emergent requirements. •
- (U) (\$1,165) Complete development of capabilities to assimilate and quality control METOC data from satellite sensors and conventional data sources using 4D variational techniques.
- (U) (\$1,150) Continue development of techniques for bathymetry and surf zone and high resolution microtopography algorithms and automated objective processing in the littoral.

R-1 Shopping List - Item No 30 (13) of 30 (27)

Exhibit R-2a, RDT&E Project Justification (X2342)

EXHIBIT R-2a, FY 2001 RDT&E,N PROJECT JUSTIFICATION

Date: February 2000

X2342 PROJECT NUMBER: 0603207N PROGRAM ELEMENT:

BUDGET ACTIVITY: 4

METOC Data Assimilation and Modeling PROJECT TITLE: Air/Ocean Tactical Applications PROGRAM ELEMENT TITLE:

- (U) (\$1,185) Continue development of shipboard shallow water ocean circulation model, next generation tide and surf models, and automated graphical applications for tactical data visualization.
- (U) (\$1,026) Begin development of next-generation active and passive acoustic models.
- (U) (\$1,025) Continue the development of mid-frequency bottom loss/bottom scatter models and databases for shallow water environments.
- (U) (\$915) Continue the verification and validation of products and data assimilation techniques developed for fleet applications.
- B. (U) PROGRAM CHANGE SUMMARY:
- (U) Funding: FY 1999 Reflects congressional reductions associated with Economic Assumptions (-47), Small Business LOCO GPSI Support (-88), SBIR (-100) and Miscellaneous Departmental Adjustments (1011). FY 2000 Reflects Congressional adjustments (-68) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638 (98); FY 2001 Miscellaneous Departmental adjustments (-407).
- (U) Schedule: Not applicable.
- (U) Technical: Not applicable
- C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.
- D. (U) ACQUISITION STRATEGY: Not applicable.

R-1 Shopping List - Item No 30 (14) of 30 (27)

Exhibit R-2a, RDT&E Project Justification (X2342)

Exhibit R-3 Project Cost	A	s (page 1)						Date: I	FEB 00			
ATION/BUDGET AC		N/5A5	PROGRAM ELEME	ELEMENT: 0603207N	Z			PROJECT 1	PRÓJECT NAME AND NUMBER:	NUMBER: X23 ASSIM	X2342 METOC DATA SSIMILATION AND MG	X2342 METOC DATA ASSIMILATION AND MODELING
Cost Categories	Contra ct Method	Performing Activity & Location	Total FY98+ PY	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complet	Total Cost	Target Value of Contract
Product Development	& Type WX	NRL	Cost 0	7,902	N/A	8,709	N/A	8,850	N/A	CONT	CONT	
	MX	NAWC-WD, PM	0	390	N/A	400	N/A	410	N/A	CONT	CONT	
	N/A	MISC	0	2,631	N/A	2,962	N/A	2,880	N/A	CONT	CONT	
Subtotal Product Development			0	10,923	N/A	12,071	N/A	12,140	N/A	CONT	CONT	
Remarks:												
Support	CP	SSA	0	145	N/A	150	N/A	155	A/N	CONT	CONT	
Subtotal Support			0	145	N/A	150	N/A	155	N/A	CONT	CONT	
1												

R-1 Shopping List - Item No 30 (15) of 30 (27)

Exhibit R-3, Project Cost Analysis

Exhibit R-3 Project Cost Analysis		(page 2)						Date: I	FEB 00			
APPROPRIATION/BUDGET ACTIVITY: RDT&E, N/5A5	ITY: RDT&E, N		GRAM ELEM	PROGRAM ELEMENT:0603207N	N/			PROJECT 1	PROJECT NAME AND NUMBER: ASSIN	NUMBER: X23 ASSIMILAT	IBER: X2342 METOC DATA ASSIMILATION AND MODELING	DATA DELING
	Contract Method &	Performing Activity &	Total FY98+		FY99 Award		FY00 Award	FY01	FY01 Award	Cost To	Total	Target Value of
Cost Categories	Type	Location	PY Cost	Cost	Date	Cost	Date	Cost		Complete	Cost	Contract
Subtotal T&E												
Remarks												
Subtotal Management												
Remarks										·		
Total Cost			0	11,068	N/A	12,221	N/A	12,295	N/A	CONT	CONT	
Remarks								·				

R-1 Shopping List - Item No 30 (16) of 30 (27)

Exhibit R-3, Project Cost Analysis

EXHIBIT R-2a, FY 2001 RDT&E, N PROJECT JUSTIFICATION

Date: February 2000

PROJECT NUMBER: 0603207N PROGRAM ELEMENT TITLE: PROGRAM ELEMENT:

Air/Ocean Tactical Applications PROJECT TITLE: Tactical METOC Applications

(U) COST (Dollars in thousands)

4

BUDGET ACTIVITY:

Program Total Complete Estimate FY 2005 Estimate FY 2004 Estimate FY 2003 Estimate FY 2002 Estimate FY 2001 Estimate FY 2000 Actual FY 1999 NUMBER & PROJECT Title

X2343 Tactical METOC Applications

CONT. 8,803 8,636 8,442 7,950 7,827 7,664

(i.e., some combination of historical and/or real-time (or near real-time) in-situ data. TDAs, also developed under this project, then use this information to predict how various weapons and sensor systems will perform given the current METOC (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The METOC Data Applications project is a continuing effort to conditions, and present these predictions in various tabular and graphic formats used by mission planners and combat/weapon system operators to develop ASW and MIW search and localization plans, USW/AAW/ASUW screens, STW profiles, airborne, surface, and subsurface platforms in support of all Naval Composite Warfare mission areas including Undersea Warfare (USW), Anti-Submarine Warfare (ASW), Mine Warfare (MIW), Amphibious Warfare (AMW), Anti-Surface Warfare (ASUW), Anti-Air Warfare (AAW), Strike Warfare (STW), and Special Warfare. Emphasis is placed on products to support littoral and regional conflict scenarios. Performance assessments leading to improvements in tactical control are conducted through a two-tiered approach: 1) METOC Decision Aids (MDAs); and, 2) Tactical Decision Aids (TDAs). MDAs consist of a mine warfare performance prediction and MDA/TDA capabilities required to characterize and/or predict sensor and weapons system performance in the highly complex littoral environments in support of regional conflict scenarios. It addresses series of analysis tools which characterize the electromagnetic (EM), electro-optical (EO), atmospheric, oceanographic, These assessments developed in Project X2341 (METOC Data Acquisition) and assimilated by software produced by Project X2342 (METOC Data interfaces to the combat systems. A current emphasis area of the project is the development of new combat system and and acoustical properties of the battlespace based on the best environmental scene description available at the time allow mission planners and warfighters, from the unit to theater level, to tactically optimize sensor employment on Project X2343 MDAs and TDAs use data obtained by sensors multi-warfare areas, particularly Mine Warfare, shallow water ASW, and missile and air defense/strike capabilities. Assimilation and Modeling), also contained in this Program Element. They also used data obtained through direct develop and field state-of-the-art software capabilities that provide sensor, communication, and weapon system performance assessments across the full spectrum of open ocean and littoral operating environments. AMW ingress and egress points, and other considerations.

R-1 Shopping List - Item No 30 (17) of 30 (27)

Exhibit R-2a, RDT&E, N Project Justification (X2343)

FY 2001 RDT&E,N PROJECT JUSTIFICATION EXHIBIT R-2a,

Tactical METOC PROJECT NUMBER: PROJECT TITLE: Air/Ocean Tactical Applications 0603207N PROGRAM ELEMENT: PROGRAM ELEMENT TITLE: ELEMENT:

Applications

Date: February 2000

X2343

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

4

BUDGET ACTIVITY:

FY 1999 ACCOMPLISHMENTS: 1. (0) Continued development of (U) (\$815) Completed development of surface to air and surface to surface EO model.

- Maximized littoral operation support by ensuring interoperability Incorporated prototype Mine Warfare tactical decision aids in baseline surface ship, air and of system via existing Fleet communication mechanisms. submarine performance prediction systems. (\$2,369)
- Completed development of initial sensor prediction capabilities for acoustic and non-acoustic sensors scheduled to be installed on Fleet combatants. Applied advanced COTS visualization techniques to facilitate operator understanding of complex littoral environmental effects on sensor performance. Performed at-sea evaluation of new capabilities. Integrated into appropriate platform ADM's. (U) (\$1,463)
- (U) (\$1,150) Integrated platform vulnerability assessment TDA into surface ship, submarine and air ADM's to perform vulnerability assessment for acoustic and non-acoustic sensors and weapons. Evaluated functionality during at-sea tests.
- Implement in the platform ADM's monitoring and measurement of key environmental parameters in support of the Oceanographer of the Navy's Battlespace METOC Data Acquisition, Assimilation and Applications strategy. Implement in the platform AL (\$1,166) Incorporate additional environmental sensor interface capabilities to allow for real time and evaluate at-sea.

2. (U) FY 2000 PLAN:

- (U) (\$915) Continue development of AREPS and begin development of next generation Electro-optical decision aids.
- air (U) (\$2,734) Continue to incorporate prototype Mine Warfare tactical decision aids in baseline surface ship, Continue to maximize littoral operation support by ensuring interoperability of system via existing Fleet communication mechanisms. and submarine performance prediction systems.

R-1 Shopping List - Item No 30 (18) of 30 (27)

Exhibit R-2a, RDT&E,N Project Justification (X2343)

EXHIBIT R-2a, FY 2001 RDT&E,N PROJECT JUSTIFICATION

Date: February 2000

Air/Ocean Tactical Applications 0603207N PROGRAM ELEMENT TITLE: PROGRAM ELEMENT: 4 BUDGET ACTIVITY:

PROJECT NUMBER: X2343
PROJECT TITLE: Tactical METOC

TLE: Tactical METOC Applications (U) (\$1,625) Continue to apply advanced COTS visualization techniques to facilitate operator understanding of complex littoral environmental effects on sensor performance and integrate into appropriate platform ADM's. Perform at-sea evaluation of new capabilities.

- (U) (\$1,240) Continue to integrate platform vulnerability assessment TDA into surface ship, submarine and air ADM's to perform vulnerability assessment for acoustic and non-acoustic sensors and weapons. Evaluate functionality during at-sea tests.
- Battlespace METOC Data Acquisition, Assimilation and Applications strategy. Implement in the platform ADM's and (U) (\$1,150) Continue to incorporate additional environmental sensor interface capabilities to allow for real time monitoring and measurement of key environmental parameters in support of the Oceanographer of the Navy's evaluate at-sea.

3. (U) FY 2001 PLAN:

- (U) (\$1,025) Continue development of next generation Electro-optical decision aids
- air (U) (\$2,724) Continue to incorporate prototype Mine Warfare tactical decision aids in baseline surface ship, Continue to maximize littoral operation support by ensuring interoperability of system via existing Fleet communication mechanisms. and submarine performance prediction systems.
- (U) (\$1,668) Continue to apply advanced COTS visualization techniques to facilitate operator understanding of complex littoral environmental effects on sensor performance and integrate into appropriate platform ADM's. Perform at-sea evaluation of new capabilities.
- (U) (\$1,135) Continue to integrate platform vulnerability assessment TDA into surface ship, submarine and air ADM's to perform vulnerability assessment for acoustic and non-acoustic sensors and weapons. Evaluate functionality during at-sea tests.
- (U) (\$1,275) Continue to incorporate additional environmental sensor interface capabilities to allow for real time monitoring and measurement of key environmental parameters in support of the Oceanographer of the Navy's Battlespace METOC Data Acquisition, Assimilation and Applications strategy. Implement in the platform ADM's and

R-1 Shopping List - Item No 30 (19) of 30 (27)

Exhibit R-2a, RDT&E,N Project Justification (X2343)

EXHIBIT R-2a, FY 2001 RDT&E, N PROJECT JUSTIFICATION

PROJECT NUMBER: PROJECT TITLE: Air/Ocean Tactical Applications 0603207N PROGRAM ELEMENT: PROGRAM ELEMENT TITLE:

4

BUDGET ACTIVITY:

TITLE: Tactical METOC Applications

X2343

Date: February 2000

B. (U) PROGRAM CHANGE SUMMARY:

Innovation Research assessment (-120), LOCO GPSI Support (-56), and Miscellaneous Departmental Adjustments (647). FY 2000 Reflects Congressional adjustments (-43) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638 (127); FY 2001 Miscellaneous Departmental adjustments (U) Funding: FY 1999 Reflects congressional reductions associated with Economic Assumptions (-30), Small Business

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

PE 0604218N (Air/Ocean Equipment Engineering). TESS/NITES will incorporate METOC data (U) RELATED RDT&E: applications.

D. (U) ACQUISITION STRATEGY: Not applicable.

R-1 Shopping List - Item No 30 (20) of 30 (27)

Exhibit R-2a, RDT&E,N Project Justification (X2343)

Exhibit R-3 Project Cost Analysis	t Analysi	(s (page 1)						Date:	FEB 00			
APPROPRIATION/BUDGET ACTIVITY: RDT&E, N/BAS	(TY: RDT&)		PROGRAM ELEMENT:0603207N	VT:060320	NZ(PROJECT	PROJECT NAME AND NUMBER:		X2343 TACTICAL METOC APPLICATIONS	AL METOC
	Contra	Performing	Total		FY99		FY00		FY01			
	t	Activity &	FY98+	FY99	Award		Award	FY01	Award	Cost To	Total	Value
Cost Categories	Method & Type	Location	PY Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contrac t
Product Development	WX	NUWC	0	675	N/A	725	N/A	740	N/A	CONT	CONT	
	WX	SSC SD	0	360	N/A	360	N/A	365	N/A	LNOD	CONT	
	WX	NRL	0	300	N/A	300	N/A	305	N/A	CONT	CONT	
	GP	IPD	0	3,067	N/A	4,000	N/A	4,100	N/A	CONT	CONT	
	CP	LOCKHEED	0	200	N/A	253	N/A	095	N/A	CONT	CONT	
	N/A	MISC	0	1,766	N/A	1,426	N/A	1,452	N/A	CONT	CONT	
Subtotal Product Development			0	6,668	N/A	7,364	N/A	7,522	N/A	CONT	CONT	
Remarks:												
Support	CP	IPD	0	295	A/N	300	A/N	305	N/A	CONT	CONT	
Subtotal Support			0	295	N/A	300	N/A	305	N/A	CONT	CONT	

R-1 Shopping List - Item No 30 (21) of 30 (27)

Exhibit R-3, Project Cost Analysis

THING TO THE TRICK

Exhibit R-3 Project Cost	t Analysis	(page 2)						Date:	FEB 00			
APPROPRIATION/BUDGET ACTIVITY: RDT&E, N/BAS	ITY: RDT&E,		PROGRAM ELEMENT: 0603207N	ENT:06032	07N			PROJECT	PROJECT NAME AND NUMBER:		343 TACTI APPI	X2343 TACTICAL METOC APPLICATIONS
	Contrac	Performing	Total FY98+	FY99	FY99 Award	FYOO	FY00		FY01 Award	Cost To		Target Value of
Cost Categories	Method & Type	Location	PY	Cost		Cost		Cost	Date	Complet	Cost	Contract
Subtotal T&E												
Remarks												,
Subtotal Management										_		
Remarks												
		Ü			(
Total Cost			0	6,963	N/A	7,664	N/A	7,827	N/A	CONT	CONT	
Remarks												

R-1 Shopping List - Item No 30 (22) of 30 (27)

Exhibit R-3, Project Cost Analysis

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EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION

Date: February 2000

X2344

PROJECT NUMBER: 0603207N PROGRAM ELEMENT: BUDGET ACTIVITY: 4

Precise Timing and Astrometry PROJECT TITLE: Air/Ocean Tactical Applications PROGRAM ELEMENT TITLE:

) COST (Dollars in thousands)

Estimate FY 2005 Estimate FY 2004 Estimate FY 2003 Estimate FY 2002 Estimate FY 2001 Estimate FY 2000 Actual FY 1999 NUMBER & PROJECT Title

To Total Complete Program

CONT.

X2344 Precise Timing and Astrometry

CONT. 1,536 1,506 1,459 1,436 (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The major thrusts of the Precise Timing and Astrometry Project in ultimately referred); 2) develop techniques for the prediction of the Earth's instantaneous orientation with respect to the Navy/DoD Master Clock System and precise time distribution networks; and, 4) develop advanced electronic light detectors and direct support of the U.S. Naval Observatory (USNO) are to: 1) address DoD requirements for needed increases in positioning accuracies of modern weapons systems by the determination of star positions (including objects at other than optical interferometry in the optical and infrared wavelength regions for very precise determination of the positions of both faint this project transitions Research (6.1) and Exploratory Development (6.2) efforts, as well as developments in the civilian stellar inertial reference system; 3) oversee the determination and dissemination of precise time information using the operational and many emerging requirements surpass current support capabilities. In response to these DoD requirements, and bright stars, satellite tracking, and space debris studies. DoD Instruction 5000.2 assigns to the Navy the responsibility for coordinating Precise Time and Time Interval (PTTI) requirements and for maintaining a PTTI reference standard (astronomical and atomic) for use by all DoD Services, Federal agencies, and related scientific laboratories. wavelengths) and the stellar inertial reference system (to which all navigation, guidance, and positioning systems are Navy is also responsible for providing astronomical data for navigation, positioning, and guidance, including space. sector, into the operational capabilities and products of the USNO.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1999 ACCOMPLISHMENTS:

(U) (\$360) Completed evaluation of time transfer capabilities via fiber optic network and began GPS time transfer capability.

R-1 Shopping List - Item No 30 (23) of 30 (27)

Exhibit R-2a, RDT&E Project Justification (X2344)

EXHIBIT R-2a, FY 2001 RDT&E, N BUDGET ITEM JUSTIFICATION

Date: February 2000

Precise Timing and Astrometry X2344 PROJECT NUMBER: PROJECT TITLE: Air/Ocean Tactical Applications PROGRAM ELEMENT TITLE: PROGRAM ELEMENT:

4

BUDGET ACTIVITY:

- (U) (\$295) Initiated evaluation of cesium fountain clock and VLBI/GPS demonstration for earth orientation parameters
- (U) (\$524) Completed 2 micron measurement capability demonstration over large angles and demonstration of large scale CCD arrays.
- (U) (\$225) Initiated InSb (Indium-Antimony) detector survey.
- 2. (U) FY 2000 PLAN:
- (U) (\$500) Continue evaluation of GPS time transfer capability.
- (U) (\$540) Continue evaluation of cesium fountain clock and VLBI/GPS demonstration for earth orientation parameters
- (U) (\$396) Continue InSb (Indium-Antimony) detector survey.
- 3. (U) FY 2001 PLAN:
- (U) (\$435) Complete evaluation of GPS time transfer capability. Begin development of next-generation time transfer capabilities
- (U) (\$285) Complete evaluation of cesium fountain clock and continue VLBI/GPS demonstration for earth orientation
- (U) (\$406) Complete InSb (Indium-Antimony) detector survey
- (\$333) Begin exploitation of emergent Master Clock technologies. Ð

R-1 Shopping List - Item No 30 (24) of 30 (27)

Exhibit R-2a, RDT&E Project Justification (X2344)

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION

Date: February 2000

0603207N PROGRAM ELEMENT: BUDGET ACTIVITY: 4

Precise Timing and Astrometry X2344 PROJECT NUMBER: PROJECT TITLE: Air/Ocean Tactical Applications PROGRAM ELEMENT TITLE:

(U) PROGRAM CHANGE SUMMARY: щ (U) Funding: FY 1999 Reflects congressional reductions associated with Economic Assumptions (-0), Small business Innovation Research assessment (-25), LOCO GPSI Support (-12), and Miscellaneous Departmental Adjustments (135).

FY 2000 Reflects Congressional adjustments (-8) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638 (3); FY 2001 Miscellaneous Departmental adjustments (-15).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

(U) OTHER PROGRAM FUNDING SUMMARY: Not applicable. ບ່

(U) RELATED RDT&E:

(U) ACQUISITION STRATEGY: Not applicable. Δ. R-1 Shopping List - Item No 30 (25) of 30 (27)

Exhibit R-2a, RDT&E Project Justification (X2344)

Exhibit R-3 Project Cost	st Analysis	(page 1)						Date:	FEB 00			
TION,	ITY: RDT&E,		PROGRAM ELEMENT:	Ì	0603207N			PROJECT	PROJECT NAME AND NUMBER:	NUMBER: X2 TIMING A	IBER: X2344 PRECISE TIMING AND ASTROMETRY	E TRY
Cost Categories	Contrac t Method	Performing Activity & Location	Total FY98+	FY99	FY99 Award Date	FYOO	FY00 Award Date	FY01	FY01 Award Date	Cost To	Total	Target Value of Contract
רספר רמרפאסודפט	& Type	Docacion	Cost	2	222	3	2	3		e	322	
Product Development	MX	NAVAL OBSERVATORY	0	1,404	N/A	1,436	N/A	1,459	N/A	CONT	CONT	
	-											
Subtotal Product Development			0	1,404	N/A	1,436	N/A	1,459	N/A	CONT	CONT	
Remarks:												
Subtotal Support									-			
Remarks												

R-1 Shopping List - Item No 30 (26) of 30 (27)

Exhibit R-3, Project Cost Analysi

Exhibit R-3 Project Cost Analysis (page 2) APPROPRIATION/BUDGET ACTIVITY: RDT&E, N/BAS	t Analysis ITY: RDT&E,		PROGRAM ELEMENT:	NT: 0603207N	N203			Date: PROJECT	FEB 00	Date: FEB 00 PROJECT NAME AND NUMBER: X	X2344 PRECISE	ISE
										TIMING A	TIMING AND ASTROMETRY	ETRY
Cost Categories	Contrac t Method	Performing Activity & Location	Total FY98+ PY	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	FY01 Cost	FY01 Award Date	Cost To Complete	Total Cost	Target Value of
1	& Type		Cost		·							Contrac t
Sibtotal TSE												
1												
		11.75										
Subtotal Management												
Remarks												
Total Cost			0	1,404	N/A	1,436	N/A	1459	N/A	CONT	CONT	
Remarks												

R-1 Shopping List - Item No 30 (27) of 30 (27)

Exhibit R-3, Project Cost Analysi

EXHIBIT R-2, FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 2000

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603216N

PROGRAM ELEMENT TITLE: Aviation Survivability

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1999 <u>Actual</u>	FY 2000 Budget	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
W0584 Aircrew Protective Clothing 6,8	othing & Devices 6,811* 9,6	vices 9,641*	2,872	2,932	2,988	3,048	3,156	CONT.	CONT.
W05∰ Aircraft Survivability Vulnerability & Safety	Vulnerability 1,285	/ & Safety 1,868	1,904	1,912	1,944	1,978	2,031	CONT.	CONT.
W0592 A/C & Ordnance Safety	ity 1,674	1,715	1,768	1,784	1,828	1,860	1,935	CONT.	CONT.
W1819 Carrier Vehicle Aircraft Fire Suppression System 814 977	aft Fire Supp 814	ression Sy 977	stem 992	1,037	1,064	1,090	1,132	CONT.	CONT.
TOTAL	10,584	14,201	7,536	7,665	7,824	7,976	8,254	CONT.	CONT.

Quantity of RDT&E Articles: Not Applicable

*The FY 1999 budget reflects a \$1,000 Congressional add for Escape System Dynamic Flow, which has been revised by \$31K for Congressional undistributed adjustments executed under project W2604. The FY 1999 budget also reflects a \$2,000 Congressional add for Helicopter Aircrew Integrated Life Support System HAILSS), which has been revised by \$64K for Congressional undistributed adjustments executed under project W2605. The FY 2000 budget reflects a \$3,000 W2604. The FY 2000 budget reflects a \$2,000 Congressional add for Helicopter Aircrew Integrated Life Support System (HAILSS), which has been revised by \$11K for Congressional undistributed adjustments executed under project W2605. The FY 2000 budget reflects a \$1,000 Congressional add for Lightweight Environmentally Sealed Parachute Assembly (LESPA), which has been revised by \$6K for Congressional undistributed adjustments executed under project W2727. The FY 2000 budget also reflects a \$1,000 Congressional add for Pilot Vehicle Interface Upgrade, which has been revised by 6K for Congressional Congressional add for Escape System Dynamic Flow, which has been revised by \$16K for Congressional undistributed adjustments executed under project undistributed adjustments executed under project W2728.

EXHIBIT R-2, FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

element counter emerging threats of next generation operational weapons systems and enhance combat effectiveness in future operational mission scenarios. (U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Aviation Survivability addresses the issues of aircrew and platform survivability, focusing on enhancing overall opportunity for aircrew and platform protection and enhanced performance. The capabilities addressed under this program

missions. In addition, this project ensures aircrew protection against natural and induced environmental or physiological hazards encountered during routine, (U) Aircrew Protective Clothing and Devices develops, demonstrates, and validates technology options that enhance aircrew capability to perform assigned combat and emergency flight operations as well as during escape, survival and rescue, following loss of aircraft.

as aircraft vulnerabilities to conventional, nuclear, chemical, biological, radiological and directed energy weapons. The Aircraft Survivability, Vulnerability and Aircraft and Ordnance Safety transitions generic insensitive munitions technology to Navy and Marine Corps air weapons, ensuring that they are insensitive to fast cook-off, slow cook-off, bullet and fragment impact and sympathetic detonation. Carrier Aircraft Fire Suppression Systems develop improved firefighting (U) The three remaining projects focus on platform survivability, addressing the reductions in aircraft susceptibility to enemy and non-combat threats, as well Safety project expands the survivability technology base and develops prototype hardware which is required to improve the survivability of Naval aircraft. systems and fire protective measures for aircraft carriers.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION and VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications.

R-1 Item No. 31 UNCLASSIFIED

1

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, Page 2 of 22)

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

PROJECT NUMBER: W0584 PROGRAM ELEMENT TITLE: Aviation Survivability PROGRAM ELEMENT: 0603216N **BUDGET ACTIVITY: 4**

PROJECT TITLE: Aircrew Protective Clothing &

Device

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1999 <u>Actual</u>	FY 2000 Budget	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total <u>Program</u>
W0584 Aircrew Protective Clothing	hing & Devices 6,811*	s 9,641*	2,872	2,932	2,988	3,048	3,156	CONT.	CONT.
TOTAL	6,811	9,641	2,872	2,932	2,988	3,048	3,156	CONT.	CONT.

Quantity of RDT&E Articles: Not Applicable

(ATCS) and Advanced Integrated Life Support System (AILSS) program. This project is validated by two Non-Acquisition Program Development Documents (NAPPDs) -- one for an Advanced Technology Crew Station (ATCS), and the other for AILSS. emérgency and life support systems designed to enhance mission effectiveness, in-flight protection and survivability. The project covers fixed and rotary wing life support equipment, advanced helmet vision systems, escape systems technology, crew centered cockpit design, and cockpit integration programs. It responds to a number of operational requirements documents, including OR# 210-05-88 for Chemical and Biological (CB) Protection, OR# 099-05-087 for Laser Eye Protection, and the joint Air Force/Navy (CAF 208-93) for an Aerospace Control Helmet Mounted Cueing System. In 1996, the various sub-projects were restructured into a combined Advanced Technology Crew Station (U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Project W0584 develops, demonstrates, and validates technology options for integrated aircrew

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1999 ACCOMPLISHMENTS:

- (U) (\$1,972) Continued the development of Advance Technology Escape System (ATES) using controllable propulsion (Fourth Generation Escape System).
- (U) (\$481) Began the development of Smart Advanced Integrated Life Support System (SAILSS) (referred to as Smart Adaptive Mission Support System (SAMSS) in the FY 99 PRESBUDG).

EXHIBIT R-2a, FY 2001 RDT&E, N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

BUDGET ACTIVITY: 4 PROGRAM ELEM

PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

PROJECT NUMBER: W0584
PROJECT TITLE: Aircrew Protective Clothing & Devices

FY 1999 ACCOMPLISHMENTS: (Continued)

- (U) (\$832) Continued the development of frequency agile laser eye protection, including non-linear materials development and demonstration. Frequency agile laser eye protection has application to both AILSS and to CRUSADER day/night helmet development, covered under the AILSS and ATCS NAPDD's, respectively.
- (U) (\$621) As a part of the Advanced Helmet Vision System (AHVS) all weather day/night display helmet, initiated upgrade from CRUSADER day only helmet mounted display system to day/night all weather helmet mounted display system.
- (U) (\$969) Begin the development of the laminar flow ejection tower test facility.
- (U) (\$1,936) Continued the development of Helicopter Aircrew Integrated Life Support System (HAILSS) with emphasis on cooling and laser eye protection.

3. FY 2000 PLAN:

- (U) (\$982) Continue ATES using controllable propulsion (Fourth Generation Escape System). Begin component integration.
- (U) (\$300) AHVS complete head/neck weight moments of inertia studies.
- (U) (\$300) Continue enhanced resolution development for Crusader day/night all weather helmet mounted display system.
- (U) (\$500) Continue SAILSS.
- (U) (\$500) Continue development of non-linear materials for frequency agile laser eye protection.
- (U) (\$98) Extend Visualization Architecture Technology (VAT) to single user virtual image display.
- (U) (\$2,984) Continue the development of the laminar flow ejection tower test facility.
- (U) (\$1,989) Continue HAILSS with emphasis on miniaturization of sensors and electronics.
- (U) (\$994) Begin the development of the lightweight environmentally sealed parachute.
- (U) (\$994) Begin the development of the pilot vehicle interface upgrade.

R-1 Item No. 31 UNCLASSIFIED

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, Page 4 of 22)

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

BUDGET ACTIVITY: 4 PROGRAM ELEMENT

PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

PROJECT NUMBER: W0584
PROJECT TITLE: Aircrew Protective Clothing & Device

4. FY 2001 PLAN:

- (U) (\$860) Continue ATES using controllable propulsion (Fourth Generation Escape System). Continue component integration.
- (U) (\$935) Complete enhanced resolution Crusader day/night all weather helmet mounted display system.
- (U) (\$477) Continue SAILSS.
- (U) (\$500) Complete technology demonstration for non-linear materials phase of frequency agile laser eye protection development.
- (U) (\$100) Continue VAT, validate single user displays.

(U) B. PROGRAM CHANGE SUMMARY

	FY 1999	FY 2000	FY2001
(U) FY 2000 President's Budget:	7,033	2,695	2,914
(U) Appropriated Value:	7,077	9,695	
(U) Adjustments from President's Budget:	-222	+6,946	42
(U) FY 2001 President's Budget Submit:	6,811	9,641	2,872

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

PROGRAM ELEMENT TITLE: Aviation Survivability PROGRAM ELEMENT: 0603216N **BUDGET ACTIVITY: 4**

PROJECT TITLE: Aircrew Protective Clothing & PROJECT NUMBER: W0584

Devices

CHANGE SUMMARY EXPLANATION:

thousand for an Across-the-Board Congressional recision. The FY 2001 net decrease of \$42 thousand reflects a decrease of \$11 thousand for minor The FY 2000 net increase of \$6,946 thousand reflects an Congressional increase of \$3,000 thousand for Escape System Dynamic Flow Test Facility, assumptions, a decrease of \$7 thousand for reprioritization of requirements within the Navy offset by an increase of \$16 thousand for Navy Working Environmentally Sealed Parachute Assembly (LESPA), and an increase of \$1,000 for Pilot Vehicle Interface Upgrades offset by a decrease of \$54 assessments, a decrease of \$32 thousand for inflation savings, and a decrease of \$59 thousand for reprioritization of requirements within the Navy. (U) Funding: The FY 1999 net decrease of \$222 thousand reflects a decrease of \$131 thousand for Small Business Innovative Research (SBIR) economic adjustments, a decrease of \$26 thousand for Strategic Sourcing Plan savings, a decrease of \$20 thousand for revised economic an increase of \$2,000 for Helicopter Aircrew Integrated Life Support System (HAILSS), an increase of \$1,000 thousand for Lightweight Capital Fund (NWCF) adjustments and an increase of \$6 thousand for Military and Civilian Pay.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

(U) C. OTHER PROGRAM FUNDING SUMMARY

Complete Estimate FY 2005 Estimate FY 2004 FY 2003 Estimate FY 2002 Estimate FY 2001 Estimate Budget FY 2000 FY 1999 Actual Appn

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Related RDT&E

(U) PE 0602201F (Aerospace Flight Dynamics)

(U) PE 0602233N (Mission Support Equipment)

(U) PE 0604264N (Aircrew Systems Development)

(U) PE 0604706F (Life Support Systems) (U) PE 0603231F (Crew Systems and Personal Protection Technology)

UNCLASSIFIED R-1 Item No. 31

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, Page 6 of 22)

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

PROGRAM ELEMENT TITLE: Aviation Survivability PROGRAM ELEMENT: 0603216N **BUDGET ACTIVITY: 4**

PROJECT NUMBER: W0584
PROJECT TITLE: Aircrew Protective Clothing &

Devices

(U) D. ACQUISITION STRATEGY: Not Applicable

(U) E. SCHEDULE PROFILE

FY 2001 FY 2000 FY 1999

To Complete

(U) Program Milestones

4th Gen Escape (ATES) & controllable propulsion

Component Integration Continue Component Integration Begin Continued

Complete 1Q 02

Crusader Day/Night All Weather Display System

Continue

Continued

Complete 40 01

Complete

Continue

Initiate 1Q 00

Continue

Complete

Continue

Continued

Tech Demo 4Q 01

Continue 1Q 00

Initiated

Continue

Continue

(U) Engineering Milestones

SAILSS

Protection (non-linear materials)

Frequency Agile Laser Eye

VAT (Single User)

VAT (Networking)

Complete

(U) T&E Milestones

Initiated 4Q 99

(U) Contract Milestones: Not applicable.

Crusader day/night system DT-1

UNCLASSIFIED R-1 Item No. 31

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, Page 7 of 22)

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DATE: February 2000

BUDGET ACTIVITY: 4		_	PROGRAM ELEMENT:		0603216N		<u> </u>	PROJECT NUMBER: PROJECT TITLE:	MBER: 'LE:	W0584 Aircrew Pro	rtective Clo	W0584 Aircrew Protective Clothing & Devices
Cost Categories;	Contract Method <u>& Type</u>	Performing Activity & <u>Location</u>	Total Prior Yrs <u>Cost</u>	FY 1999 <u>Cost</u>	FY 1999 Award <u>Date</u>	FY 2000 <u>Cost</u>	FY 2000 Award <u>Date</u>	FY 2001 <u>Cost</u>	FY 2001 Award <u>Date</u>	Cost to	Total <u>Cost</u>	Target Value of <u>Contract</u>
Miscellaneous Miscellaneous McDonnell Douglas	WX Various	NAWCAD PAX Various	13,134 10,765 1,325	2,324	Various Various	1,192	Various	1,386	Various	CONT.	CONT.	
Subtotal Product Development			26,884	2,324		1,192		1,386		CONT.	CONT.	
Kemarks Miscellaneous	×	Various	322	430	Various	305	Various	499	Various	CONT.	CONT.	
Subtotal Support Remarks			322	430		305		499		CONT.	CONT.	

R-1 Item No. 31 UNCLASSIFIED

Exhibit R-3, Project Cost Analysis (Exhibit R-3, Page 8 of 22)

February 2000

DATE:

EXHIBIT R-3, FY 2001 RDT&E,N COST ANALYSIS

BUDGET ACTIVITY: 4			PROGRAM ELEMENT:	EMENT:	0603216N		c c	PROJECT NUMBER: PROJECT TITLE:		W0584 Aircrew Protective Clothing & Devices	:tive Clothing	& Devices
Cost Categories:	Contract Method	Performing Activity & <u>Location</u>	Total Prior Yrs <u>Cost</u>	FY 1999 <u>Cost</u>	FY 1999 Award <u>Date</u>	FY 2000 <u>Cost</u>	FY 2000 Award <u>Date</u>	FY 2001 <u>Cost</u>	FY 2001 Award <u>Date</u>	Cost to Complete	Total <u>Cost</u>	Target Value of <u>Contract</u>
Miscellaneous developmental test & evaluation	Various	Various	1869	4,047	Various	8,134	Various	977	Various	CONT.	CONT.	
Subtotal Test & Evaluation			1869	4,047		8,134		27.6		CONT.	CONT.	
Remarks												
Travel		Various	65	10	N/A	10	Y/N	10	A/N	N/A.	N/A	
Subtotal Management			92	10		10		10		0	0	
Remarks												
Total Cost			29,140	6,811		9,641		2,872		CONT.	CONT.	

R-1 Item No. 31 UNCLASSIFIED

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

PROGRAM ELEMENT TITLE: Aviation Survivability **PROGRAM ELEMENT: 0603216N BUDGET ACTIVITY: 4**

PROJECT NUMBER: W0591
PROJECT TITLE: Aircraft Survivability Vulnerability

(U) COST: (Dollars in Thousands)

roject Number & Title	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To	Total
	Actual	Budget	Estimate	Estimate	Estimate	Estimate	Estimate	Complete	Program
W0591 Aircraft Survivability Vuinerability 1,285 TOTAL 1285	Jinerability & 3 1,285 1285	sarety 1,868 1,868	1,904 1,904	1,912 1,912	1,944 1,944	1,978 1,978	2,031 2,031	CONT.	CONT.

Quantity of RDT&E Articles: Not Applicable

probability of a kill if the aircraft is hit (vulnerability). Types of programs funded under this project include signature reduction efforts, subsystem and component hardening and development of fire and explosion suppression techniques for fuel systems. Beginning in fiscal year 1996 Chemical and Biological efforts were hardware to improve the survivability of Navy and Marine Corps aircraft. This project addresses the likelihood of an aircraft being hit (susceptibility) and the (U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Aircraft Survivability, Vulnerability and Safety. This project develops prototype consolidated under OSD program element 0603384D (Chemical and Biological Defense (Advanced Development)).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

- 1. FY 1999 ACCOMPLISHMENTS:
- (U) (\$1,122) Continued the development of a rotary wing Infrared (IR) survivability signature suppression program (completed prototype ground test).
- (U) (\$10) Completed the development of RDT&E master plan (will be updated bi-annually).
- (U) (\$30) Continued data population of Aircraft Survivability Database.
- Continued current Survivability Analysis Methodology development to include a Survivability Analysis Methodology Roadmap for USN/USMC. (U) (\$123)

UNCLASSIFIED EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603216N

PROGRAM ELEMENT TITLE: Aviation Survivability

PROJECT NUMBER: W0591 PROJECT TITLE: Aircraft Survivability Vulnerability

DATE: February 2000

& Safety

2. FY 2000 PLAN:

- (U) (\$1,548) Continue the development of a rotary wing IR survivability signature suppression program (initiate flight test).
- Initiate uninhabited aerial vehicle (UAV) survivability program; focus on trade study/cost analysis. (U) (\$100)
- (U) (\$20) Annual update of Aircraft Survivability Database.
- (U) (\$200) Continue development of Survivability Analysis Methodology (based on FY99 roadmap).

3. FY 2001 PLAN:

- (U) (\$1,424) Complete the development of a rotary wing IR survivability signature suppression program.
- (U) (\$20) Biannual update of RDT&E master plan.
- (U) (\$20) Annual update of Aircraft Survivability Database.
- Continue development of Survivability Analysis Methodology (based on FY99 roadmap). (U) (\$200)
 - (U) (\$240) Continue UAV survivability trade study (define hardware technology candidate).

(U) B. PROGRAM CHANGE SUMMARY

FY 2001	1,932		-28	1,904
FY 2000	1,878	1,878	-10	1,868
FY 1999	1,505	1,509	-220	1,285
	(U) FY 2000 President's Budget:	(U) Appropriated Value:	(U) Adjustments from President's Budget	(U) FY 2001 President's Budget Submit:

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N

PROGRAM ELEMENT: 0603Z16N PROGRAM ELEMENT TITLE: Aviation Survivability

DATE: February 2000 PROJECT NUMBER: W0591 PROJECT TITLE: Aircraft Survivability Vulnerability

& Safety

CHANGE SUMMARY EXPLANATION:

reflects a \$10 thousand decrease for an Across-the Board Congressional rescission. The FY 2001 net decrease of \$28 thousand reflects a decrease of \$11 thousand for Strategic Sourcing Plan savings, a decrease of \$20 thousand for revised economic assumptions, and a decrease of \$5 thousand for reprioritization of requirements within the Navy offset by an increase of \$6 thousand for Navy Working Capital Fund (NWCF) adjustments and an increase of \$2 thousand for (U)Funding: The FY 1999 net decrease of \$220 thousand reflects a decrease of \$31 thousand for Small Business Innovative Research (SBIR) assessments, a decrease of \$182 thousand for reprioritization of requirements within the Navy, and a decrease of \$7 thousand for inflation savings. The FY 2000 decrease Military and Civilian pay.

(U) Schedule: Not applicable

(U) Technical: Not applicable

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not applicable

Related RDT&E

(U) PE 0605132D (Joint Technical Coordinating Group on Aircraft Survivability)

(U) PE 0603384D (Chemical/Biological Defense (Advanced Development)

(U) D. ACQUISITION STRATEGY: Not Applicable.

To Complete Complete FY2001 Initiate 1Q 00 FY 2000 FY 1999 UAV survivability trade study (U) Program Milestones (U) E. SCHEDULE PROFILE:

(U) T&E Milestones

(U) Engineering Milestones: Not Applicable

IR Suppressor ground test Completed

IR Suppressor flight test Initiate 4Q 00

Complete 2Q 01

(U) Contract Milestones: Not applicable

R-1 Item No. 31 UNCLASSIFIED

Exhibit R-2a RDT&E Project Justification (Exhibit R-2a, Page 12 of 22)

EXHIBIT R-3, FY 2001 RDT&E,N COST ANALYSIS

February 2000

DATE;

BUDGET ACTIVITY: 4			PROGRAM ELEMENT:	LEMENT:	0603216N		c c	PROJECT NUMBER: PROJECT TITLE:	ä	W0591 AIRCRAFT SURV VUL & SAFETY	JRV VUL &	SAFETY
Cost Categories:	Contract Method & Type	Performing Activity & <u>Location</u>	Total Prior Yrs <u>Cost</u>	FY 1999 <u>Cost</u>	FY 1999 Award <u>Date</u>	FY 2000 <u>Cost</u>	FY 2000 Award <u>Date</u>	FY 2001 <u>Cost</u>	FY 2001 Award <u>Date</u>	Cost to	Total <u>Cost</u>	Target Value of <u>Contract</u>
Miscellaneous	XX	Various	5115	277	Various	334	Various	528	Various	CONT.	CONT.	
Primary hardware development	SS/CPFF	SIKORSKY Connecticut	635	877	Oct 98	1000	Oct 99	629	Oct 00	3226	3226	3226
Primary hardware development	SS/CPFF	Bell Helicopter Ft. Worth, TX	1307									
Subtotal Project Development			7057	1154		1334		1187		CONT.	CONT.	
Remarks												

CONT.

CONT.

Various

127

Various

150

×

Miscellaneous

CONT.

CONT.

127

150

0

0

Subtotal Support

Remarks

R-1 Item No. 31 UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis (Exhibit R-3, Page 13 of 22)

EXHIBIT R-3, FY 2001 RDT&E,N COST ANALYSIS

February 2000

DATE:

BUDGET ACTIVITY: 4		_	PROGRAM ELEMENT:	EMENT:	0603216N		<u>a.</u> a.	PROJECT NUMBER: PROJECT TITLE:		W0591 AIRCRAFT SURV VUL & SAFETY	URV VUL &	SAFETY
Cost Categories:	Contract Method & Type	Performing Activity & <u>Location</u>	Total Prior Yrs <u>Cost</u>	FY 1999 <u>Cost</u>	FY 1999 Award <u>Date</u>	FY 2000 <u>Cost</u>	FY 2000 Award <u>Date</u>	FY 2001 <u>Cost</u>	FY 2001 Award <u>Date</u>	Cost to Complete	Total <u>Cost</u>	Target Value of Contract
Miscellaneous	Various	Various	770	121	NA	374	Various	580	Various	CONT.	CONT.	
Subtotal Test & Evaluation			022	121		374		580		CONT.	CONT.	
Remarks												
Travel			165	10	N/A	10	N/A	10	N/A	CONT.	CONT.	
Subtotal Management			165	10		10		19		CONT.	CONT.	
Remarks												
Total Cost			7992	1285		1868		1904		CONT.	CONT.	

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

PROJECT NUMBER: W0592 PROGRAM ELEMENT TITLE: Aviation Survivability **PROGRAM ELEMENT: 0603216N BUDGET ACTIVITY: 4**

PROJECT TITLE: A/C & Ordnance Safety

(U) COST: (Dollars in Thousands)

Project Number & Title	FY 1999 <u>Actual</u>	FY 2000 Budget	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total <u>Program</u>
W0592 A/C & Ordnance Safety	1,674	1,715	1,768	1,784	1,828	1,860	1,935	CONT.	CONT.
TOTAL	1,674	1,715	1,768	1,784	1,828	1,860	1,935	CONT.	CONT.

Quantity of RDT&E Articles: Not Applicable

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project transitions Insensitive Munitions (IM) technology from IM Advanced Development (generic technology) to Air Weapon Systems to comply with Chief of Naval Operations direction that all munitions carried aboard Navy ships be insensitive to fast cook-off (FCO), slow cook-off (SCO), bullet and fragment impact (BI and FI), and sympathetic detonation (SD).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

- 1. (U) FY 1999 ACCOMPLISHMENTS:
- (U) (\$241) Loaded composite cases and conducted IM and static fire testing of 2.75-inch rocket motor.
- (U) (\$469) Addressed sympathetic detonation/containment design for tandem warheads and evaluating concept.
- (U) (\$964) Completed the High Performance Air to Missile (HPAAM) Hydroxyl Terminated Polyether (HTPE) full scale IM tests and static firings. Continued composite case captive carry demonstration.

UNCLASSIFIED R-1 Item No. 31

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

BUDGET ACTIVITY: 4 PROGRA

PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

PROJECT NUMBER: W0592
PROJECT TITLE: A/C & Ordnance Safety

2. (U) FY 2000 PLAN:

- (U) (\$338) Demonstrate manufacturability of 2.75-inch rocket motor. Evaluate reactive material warheads for IM compliance.
- (U) (\$424) Continue evaluation of IM technology to pumice as a sympathetic detonation barrier and validate tandem warhead containment
- (U) (\$953) Fabricate Sidewinder composite rocket motor cases. Perform ground and flight testing of Sidewinder composite rocket motor.

3. (U) FY 2001 PLAN:

- (U) (\$855) Continue evaluating reactive material warheads for IM compliance.
- (U) (\$413) Demonstrate pumice as a sympathetic detonation barrier for weapon shipping containers.
- (U) (\$500) Complete flight testing and document flight certification process for Sidewinder composite case.

	<u>FY 2001</u>	1,799		-31	1,768
	FY 2000	1,725	1,725	-10	1,715
	FY 1999	1,723	1,732	49	1,674
III B. PROGRAM CHANGE SHIMMARY		(U) FY 2000 President's Budget:	(U) Appropriated Value:	(U) Adjustments from President's Budget:	(U) FY 2001 President's Budget Submit:

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Aviation Survivability PROGRAM ELEMENT: 0603216N

PROJECT TITLE: A/C & Ordnance Safety PROJECT NUMBER: W0592

CHANGE SUMMARY EXPLANATION:

rescission. The FY 2001 net decrease of \$31 thousand reflects a decrease of \$26 thousand for Strategic Sourcing Plan savings, a decrease of \$19 (U) Funding: The FY 1999 net decrease of \$49 thousand reflects a decrease of \$8 thousand for inflation savings and a decrease of \$41 thousand for reprioritization of requirements within the Navy. The FY 2000 decrease reflects a \$10 thousand decrease for an Across-the Board Congressional thousand for revised economic assumptions, and a decrease of \$5 thousand for reprioritization of requirements within the Navy offset by an increase of \$14 thousand for Navy Working Capital Fund (NWCF) adjustments and an increase of \$5 thousand for Military and Civilian pay.

(U) Schedule: Not applicable

(U) Technical: Not applicable

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not applicable

Related RDT&E: PE 0604802A PE 0603609N

(U) D. ACQUISITION STRATEGY: This is a non-ACAT program with no specific acquisition strategies.

(U) E. SCHEDULE PROFILE: Not applicable

UNCLASSIFIED R-1 Item No. 31

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, Page 17 of 22)

			EXHIBIT R-3,	FY 2001 RD	EXHIBIT R-3, FY 2001 RDT&E,N COST ANALYSIS	ANALYSIS					DATE:	February 2000
BUDGET ACTIVITY: 4		ā	ROGRAM EL	PROGRAM ELEMENT: 0603216N	3216N		PROJE	PROJECT NUMBER: W0592 ROJECT TITLE: A/C & Ordn	PROJECT NUMBER: W0592 PROJECT TITLE: A/C & Ordnance Safety	ice Safety		
Cost Categories:	Contract Method	Performing Activity & <u>Location</u>	Total PriorYrs <u>Cost</u>	FY 1999 <u>Cost</u>	FY 1999 Award <u>Date</u>	FY 2000 <u>Cost</u>	FY 2000 Award <u>Date</u>	FY 2001 <u>Cost</u>	FY 2001 Award <u>Date</u>	Cost to Complete	Total <u>Cost</u>	Target Value of <u>Contract</u>
Systems Engineering	W	NAWC WD China Lake	9,293	1,654	10/98	1,685	10/99	1,738	10/00	CONT	CONT	
Subtotal Product Development Remarks:			9,293	1,654		1,685		1,738		CONT	CONT	
Subtotal Support			0	0		•		0		0	0	
Remarks: Subtotal Test & Evaluation			0	0		0		0		0	0	
Remarks: Miscellaneous	××	NAWCAD	9	20	10/98	30	10/99	30	10/00	CONT	CONT	
Subtotal Management		PAX	10	20		30		30		CONT	CONT	
Remarks: Total Cost			9,303	1,674		1,715		1,768		CONT	CONT	
				R-1 Item No. UNCLASSIFII	R-1 Item No. 31 UNCLASSIFIED	7.0			ŭ	Evhilit D.2s DOT&E Designed Trefffication	90 100 100 100 100 100 100 100 100 100 1	efffication and

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, Page 18 of 22)

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

DATE: February 2000 PROJECT NUMBER: W1819 PROJECT TITLE: CV A/C Fire Suppression System

(U) COST: (Dollars in Thousands)

To Total	T. CONT.	IT. CONT.
5 To	.2 CONT.	2 CONT.
FY 2005	0 1,132	0 1,132
S FY 2004 Estimate	1,090	1,090
FY 2003 Estimate	1,064	1,064
FY 2002 Estimate	1,037	1,037
FY 2001 Estimate	em 992	992
FY 2000 Budget	ession Syste 977	7.16
FY 1999 Project Number & Title Actual	W1819 Carrier Vehicle Aircraft Fire Suppression System	814
Project	W1819	TOTAL

Quantity of RDT&E Articles: Not Applicable

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops improvedfirefighting systems and fire protective measures for aircraft related fires on aircraft carriers, including assessment of fire properties, definition of fire threats, improvements to firefighting agents and delivery systems, fire detection and suppression system performance evaluations, and firefighter training improvements.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1999 ACCOMPLISHMENTS:

- (U) (\$83) Completed evaluation of ordnance cooling requirements; remained current on ordnance inventory, conducted full scale fire testing of dummy ordnance (assessed defined threat to individual components, evaluated impact of various fire fighting techniques and equipment)
- (U) (\$386) Upgraded capabilities of environmentally safe fire test facility; maintained compliant permit status, designed and constructed test article provisions for conducting wheel/brake, electrical, 2D/3D, spill, and mass conflagration evaluations.
- (U) (\$100) Continued fire testing of agents, equipment, aircraft and ordnance materials; finalized engine fire testing, commence wheel/brake and electrical full scale testing (assessed collateral damage, conducted comparative systems testing, developed test standards, optimized operational methodologies).
- (U) (\$245) Completed development of flight deck imaging system; developed system designs for comparative testing, secure test articles, develop pass/fail criteria.

UNCLASSIFIED EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

BUDGET ACTIVITY: 4

PROJECT NUMBER: W1819
PROJECT TITLE: CV A/C Fire Suppression System

FY 2000 PLAN:

- (U) (\$542) Conduct testing of fire test standards for wheel/brake, electrical, and spill fires. Identify critical test parameters and provide adequate instrumentation for testing. Manufacture details for fire threat simulators with adequate test repeatability provisions. Conduct full scale, fleet representative fire testing to evaluate relative performance of available and developmental extinguishing systems.
- (U) (\$155) Enhance the Mobile Aircraft Fire Fighting Training Device by evaluating options to propane fuel. Conduct live fire training demonstrations. Incorporate system upgrades based on fleet responses. Establish zoning criteria to maximize fleet personnel training opportunities.
- enhancements, development of novel fire fighting approaches, and optimized personnel emergency procedures. Assess opportunities for overall current level of onboard fire fighting provisions. Ensure adequate fire fighting provisions are maintained through evaluation of systems hardware (U) (\$280) Continue carrier reduced manning studies. Evaluate potential negative safety impact of reduced manning of Navy ships relative to improvement in shipboard handling of fire emergencies.

3. FY 2001 PLAN:

- (U) (\$459) Complete testing and finalize fire test standards for wheel/brake, electrical, and spill fires. Complete identification of critical test parameters and provision of adequate instrumentation for testing. Compile pros and cons of each system for review.
- (U) (\$225) Continue carrier reduced manning studies. Evaluate potential negative safety impact of reduced manning of Navy ships relative to current level of onboard fire fighting provisions. Ensure adequate fire fighting provisions are maintained through evaluation of systems hardware enhancements, development of novel fire fighting approaches, and optimized personnel emergency procedures. Assess opportunities for overall improvement in shipboard handling of fire emergencies.
- (U) (\$134) Initiate studies of fire threat from alternate fuel. Evaluate the different characteristics of JP-8 versus JP-5 fires. Identify deficiencies and promote opportunities for improvement.
- electrical and electromagnetic components aboard ship. Evaluate remote fire detection and fire suppression methodologies and test prototypical hardware for performance. (U) (\$174) Evaluate next generation fire threats aboard carriers. Assess enhanced fire threats associated with more reliance on high powered

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

PROGRAM ELEMENT TITLE: Aviation Survivability PROGRAM ELEMENT: 0603216N **BUDGET ACTIVITY: 4**

PROJECT NUMBER: W1819
PROJECT TITLE: CV A/C Fire Suppression System

CHANGE SUMMARY EXPLANATION:

decrease of \$11 thousand for revised economic assumptions, and a decrease of \$3 thousand for reprioritization of requirements within the Navy offset The FY2000 decrease reflects a \$5 thousand for an Across -the Board Congressional rescission. The FY 2001 net decrease of \$30 thousand reflects a decrease of \$9 thousand for Strategic Sourcing Plan savings, a decrease of \$20 thousand for Navy Working Capital Fund (NWCF) adjustments, a by an increase of \$10 thousand for Navy Working Capital Fund (NWCF) adjustments and an increase of \$3 thousand for Military and Civilian Pay. assessments, a decrease of \$4 thousand for inflation savings, and a decrease of \$17 thousand for reprioritization of requirements within the Navy. (U) Funding: The FY1999 net decrease of \$28 thousand reflects a decrease of \$7 thousand for Small Business Innovation Research (SBIR)

(U) Schedule: Not applicable

(U) Technical: Not applicable

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not Applicable.

Related RDT&E: Not applicable

(U) D. ACQUISITION STRATEGY: Not Applicable.

(U) E. SCHEDULE PROFILE: Not Applicable.

UNCLASSIFIED

EXHIBIT R-3, FY 2001 RDT&E,N COST ANALYSIS

DATE: February 2000

	Targe Value o <u>Contra</u>													
ppression	Total <u>Cost</u>	CONT.	CONT.		CONT.	CONT.		CONT.	CONT.		CONT.	CONT.		CONT.
W1819 CV A/C Fire Suppression	Cost to Complete	CONT.	CONT.		CONT.	CONT.		CONT.	CONT.		CONT.	CONT.		CONT.
NUMBER: TITLE:	FY 2001 Award <u>Date</u>	Various			Various			Various			Various			
PROJECT NU	FY 2001 <u>Cost</u>	184	184		376	376		422	422		10	10		992
A A	FY 2000 Award I <u>Date</u>	Various			Various			Various			Various			
	FY 2000 <u>Cost</u>	165	165		280	280		522	522		9	10		977
0603216N	FY 1999 Award <u>Date</u>	Various						Various			Various			
LEMENT:	FY 1999 <u>Cost</u>	631	631		0	0		173	173		9	10		814
PROGRAM ELEMENT:	Total Prior Yrs <u>Cost</u>	4618	4618		1104	1104		2238	2238		25	25		7,985
-	Performing Activity & <u>Location</u>	MISC			MISC			MISC			WX NAWCAD PAX			
	Contract Method	XM			WX			WX			W			
BUDGET ACTIVITY: 4	Cost Categories:	Miscellaneous	Subtotal Product Development	Remarks:	Miscellaneous	Subtotal Support	Remarks:	Miscellaneous	Subtotal Test & Evaluation	Remarks:	Travel	Subtotal Management	Remarks	Total Cost

R-1 Item No. 31 UNCLASSIFIED

Exhibit R-3, Project Cost Analysis (Exhibit R-3, Page 22 of 22)

UNCLASSIFIED EXHIBIT R-2, FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 2000

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603261N PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance

(U) COST: (Dollars in Thousands)

Estimate Estimate Estimate 1.950	_
_ ,	FY 2001 Estimate
	FY 2000 Estimate

Unmanned Aerial Vehicle (UAV) concept of operation (CONOP) development. Additionally, in Fiscal years 1998 and 1999 this program allowed development of (U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program provides for the development of studies, analyses and demonstrations for systems to provide timely and accurate imagery intelligence for the U.S. Marine Corps. Specifically:

- UAV CONOPS Research: The efforts supported under this program provide studies of concept of operations (CONOPS) for UAV integration into USN Battlespace Dominance Operations. Specifically, the CONOPS research will evaluate the roles UAV's play innetwork centric warfare, sensor-to-shooter, and time critical strike. Areas of interest include the joint utility of Global Hawk (LVL IIIV) and Predator (LVL IV) integration into CVBG operations.
- altitude over flight or stand off ranges. Imagery data is digitally recorded and can be data linked in near real-time and/or returned to base for playback, analysis, F/A –18D Tactical Reconnaissance System: The F/A-18D Tactical Reconnaissance System will replace the RF-4B which was phased out in 1990. Electro-Optical, Infrared and Synthetic Aperture Radar (SAR) sensors will provide high resolution imagery in all weather conditions, day or night at low, medium or high processing, and storage. •

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET UNCLASSIFIED

DATE: February 2000

PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROGRAM ELEMENT: 0603261N **BUDGET ACTIVITY: 4**

UAV CONOPS PROJECT NUMBER: A2467 PROJECT TITLE:

Research

U) COST: (Dollars in Thousands)

Project Number & Title	FY 1999 <u>Actual</u>	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To Complete	Total Program
\2467 UAV CONOPS Research	0	1,964	1,956	1,950	1,945	1,943	1,946	CONT.	CONT.
TOTAL	0	1,964	1,956	1,950	1,945	1,943	1,946	CONT.	CONT.

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program provides funding for concept of operation (CONOP) development, research and studies in the integration of tactical unmanned aerial vehicles into Naval Strike Warfare. This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware and technologies for experimental test related to specific ship or aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

Previous Accomplishments:

- 1. FY 2000 Plan:
- (\$1,387) Initiate studies and demonstrations for CONOPS development into Naval Strike Warfare. (\$577) Funds miscellaneous efforts including technical and management support.
- 2. FY 2001 Plan:
- (U) (\$1,956) Continue studies and demonstrations for CONOPS development into Naval Strike Warfare.

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET UNCLASSIFIED

DATE: February 2000

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603261N
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance

UAV CONOPS Research PROJECT NUMBER: A2467
PROJECT TITLE: UAV C

(U) B. PROGRAM CHANGE SUMMARY

	FY 1999	FY 2000	FY 2001
(U) FY 2000 President's Budget:	0	1,975	1,981
(U) Appropriated Value:	0	1,975	
(U) Adjustments from Pres Budget:	0	7	-25
(U) FY 2001 President 's Budget Submit:	0	1,964	1,956

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 2000 decrease reflects a \$11 thousand Across the Board Congressional Recision. The FY 2001 net decrease of \$25 thousand reflects a decrease of \$13 thousand for revised economic assumptions, and a decrease of \$12 thousand for reprioritization of requirements within the Navy.

(U) Schedule: N/A

(U) Technical: N/A

(U) C. OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) D. ACQUISITION STRATEGY: N/A.

(U) E. SCHEDULE PROFILE: N/A.

R-1 Item No. 33 UNCLASSIFIED

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, Page 3 of 7)

EXHIBIT R-3, FY 2001 RDT&E,N COST ANALYSIS

DATE: February 2000

BUDGET ACTIVITY: 4		PROGR	PROGRAM ELEMENT: 0603261N ROGRAM ELEMENT TITLE: TACTICAL AIRBORNE RECONNAISSANCE	r: 0603261 TITLE: TAC1	N FICAL AIRBC	ORNE RECON	WAISSANCE		PROJECT NUMBER: A2467 PROJECT TITLE: UAV C	R: A2467 UAV CONO	A2467 UAV CONOPS RESEARCH	픙
Cost Categories:	Contract Method	Performing Activity & <u>Location</u>	Total Prior Yrs <u>Cost</u>	FY 1999 <u>Cost</u>	FY 1999 Award <u>Date</u>	FY 2000 <u>Cost</u>	FY 2000 Award <u>Date</u>	FY 2001 <u>Cost</u>	FY 2001 Award <u>Date</u>	Cost to <u>Complete</u>	Total Cost	Target Value of <u>Contract</u>
Project Development Organizations NSAWC	W R	NSAWC Fallon,NV		0		1,387	12/99	1,956	12/00	CONT.	CONT.	
Subtotal Project Development Remarks:				0		1,387		1,956		CONT.	CONT.	
Support Organizations NAWCAD	×	WX NAWCAD Pax				148	12/99					
Subtotal Support		Ā Ā		0		148						
Remarks:												
Test & Evaluation Organizations												
Subtotal Test & Evaluation												
Remarks:												
Management Organizations												
FEDSIM NAS, Cherry Point MISC.	∃ X	FEDSIM, Va Cherry Pt.,NC				207 89 133	2/00 2/00 4/00					
Subtotal Management Remarks:				0		429						
Total Cost				0		1,964		1,956		CONT.	CONT.	

R-1 Item No. 33 UNCLASSIFIED

Exhibit R-3, Project Cost Analysis (Exhibit R-3, Page 4 of 7)

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 2000

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603261N
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tactical Reconnaissance System

(U) COST: (Dollars in Thousands)

high altitude over flight or stand off ranges. Imagery data is digitally recorded and can be data linked in near real-time and/or returned to base for playback, analysis, (U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Tactical Airborne Reconnaissance Program develops systems to provide timely and Electro-Optical, Infrared and Synthetic Aperture Radar (SAR) sensors will provide high resolution imagery in all weather conditions, day or night at low, medium or accurate imagery intelligence for the U.S. Marine Corps. The F/A-18D Tactical Reconnaissance System will replace the RF-4B that was phased out in 1990. processing, and storage.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

- 1. FY 1999 ACCOMPLISHMENTS:
- (U) (1,444) Completed Design and Development (D&D) Phase and conducted OPEVAL
- FY 2000 PLAN: Not Applicable 7
- FY 2001 PLAN: Not Applicable က်

R-1 Item No. 33 UNCLASSIFIED

(Exhibit R-2a, Page 5 of 7) Exhibit R-2a, Project Justification

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET UNCLASSIFIED

DATE: February 2000

PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROGRAM ELEMENT: 0603261N **BUDGET ACTIVITY: 4** System

PROJECT NUMBER: E0534
PROJECT TITLE: Tactical Reconnaissance

(1) B PROGRAM CHANGE SUMMARY			
	FY 1999	FY 2000	FY 2001
(U) FY 2000 President's Budget:	1,474	0	0
(U) Appropriated Value:	1,479	0	0
(U) Adjustments from President's Budget:	-30	0	0
(U) FY 2001 President's Budget Submit:	1,444	0	0

CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1999 net decrease of 30 thousand reflects a decrease of \$7 thousand for revised economic assumptions, a decrease of \$19 thousand for Small Business Innovation Research (SBIR) assessment, and a decrease of \$4 thousand for paymen t of lapsed liability contracts.

(U) Schedule: Due to technical issues addressed below, the completion of software enhancements, OPEVAL, and the Full Rate Production decision have slipped.

(U) Technical: Software maturity and hardware reliability growth has not progressed at the expected rate to meet original milestones.

R-1 Item No. 33 UNCLASSIFIED

Exhibit R-2a, Project Justification (Exhibit R-2a, Page 6 of 7)

UNCLASSIFIED EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 2000

			•			<u>.</u>			
BUDGET ACTIVITY: 4 System	PROGRAM ELEMENT: 0603261N PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance	: 06032671 TITLE: Ta	ا ctical Airbor	ne Reconn	aissance	PROJECT	PROJECT NUMBER: E0534 PROJECT TITLE: Tactical	PROJECT NUMBER: E0534 PROJECT TITLE: Tactical Reconnaissance	ø
(U) C. OTHER PROGRAM FUNDING SUMMARY	NDING SUMMARY								
Appn	FY 1999 Budget	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	To <u>Complete</u>	
APN-5(OSIP 03-97 ATARS)	41,899	55,792	23,793	0	0	0	0	12,723	
Related RDT&E: Not Applicable	ø,								
(U) D. ACQUISITION STRATEGY: Currently on	EGY: Currently on contra	act for LRIP-2	contract for LRIP-2, which is a sole source contract with Boeing.	sole source (contract with	Boeing.			
(U) E. SCHEDULE PROFILE:			FY 1999		FY 2000	FY 2001			
(U) Program Milestones	S			2Q/00-FULL RATE PRODUCTION DECISION	2/00-FULL RATE IDUCTION DECISION				
(U) Engineering Milestones	ones) E	30/99-COMPLETE SOFTWARE ENHANCEMENTS	ETE E ATS					
(U) T&E Milestones		Q	4Q/99 OPEVAL	ш	10/00 DT III/ FOT&E				
(U) Contract Milestones	v			2Q/00-FRP CONTRACT AWARD	2Q/00-FRP CONTRACT AWARD				

UNCLASSIFIED

JDGET ACTIVITY		5			CA:			
IDGET ACTIVITY						Febr	February 2000	
	IT NAME AND NU	MBER	R-1 ITEM NOI	R-1 ITEM NOMENCLATURE				
RDT&E, N / BA 4 ADV COMBAT SYS	ADV COMBAT SYS TECH/0603382N	382N	Advanced Co	Advanced Combat System Technology /0603382N	Technology	, /0603382N		
COST (\$ in Millions)	FY 1999 FY 2000	0 FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Total PE Cost 6.437	437 6.790	6.943	6.989	6.964	7.024	7.165	CONT.	CONT.
Advanced Combat System Technology/K0324 6.437	437 6.790	6.943	6.989	6.964	7.024	7.165	CONT.	CONT.
Quantity of RDT&E Articles Not Applicable								

A. (U) Mission Description and Budget Item Justification

advances can be integrated into the AEGIS system and subsequent combat systems, and to plan combat system baseline upgrade schedules. Fully Distributed Computing Architecture is the first advanced development effort, leveraging the joint AEGIS/Defense Advanced Research Projects Agency (DARPA) High Performance Distributive mature them to transition candidates for introduction into the AEGIS Weapon System. This program will take a disciplined systems engineering approach to find how these distributed architecture. Radar studies are also being conducted to identify state-of-the-art technology options for the next generation radar. Complex Tactical Information Management of the flow and display of tactical information through the "detect-control-engage" process to better support the operator/decision maker will be a significant priority This line item funds studies and experiments which will be conducted in distributed computer architecture, radar technology, and Tactical Informational Management Concepts to Computing (Hiper-D) technology effort. It implements the results of distributed processing advances to replace the current AEGIS Combat System architecture with an open, of this task. These advanced technologies are candidate systems for future baseline upgrades.

(U) PROGRAM ACCOMPLISHIMENTS AND PLANS:

(U) FY99 ACCOMPLISHMENTS:

- (U) (\$2.000) Conducted studies concerning the feasibility of applying Visualization Architecture and Technology (VAT) concepts to shipboard use.
- improvements in upgrades against previously identified shortfalls. Provided feedback on existing shortfalls for future enhancements. Conducted work within the commercial - (U) (\$1.008) Continued system engineering experiments with currently emerging Commercial Off-The-Shelf (COTS) and DARPA computer technologies to assess standards communities to address the shortfalls in computing capabilities for Navy applications.
- (U) (\$1.317) Conducted an integrated demonstration in the computing testbed of selected AEGIS Weapon System capabilities focused on initial QoS (Quality of Service) functionality in the middleware domain. Demonstrated an initial integrated set of common engineering services for the information infrastructure, including the addition of another warfighting or other shipboard information/controlsystem. Also demonstrated initial middleware capabilities within the Common C&D (Command & Decision) functional areas that support object-oriented computer program architectures.
- (U) (\$1.000) Initiated risk reduction experiments focused on middleware issues associated with object-oriented computer program architectures with an initial target of Common C&D capability for AEGIS combat systems. Assessed maturity and transition potential of available or emerging technologies into AEGIS Baseline developmentefforts on Baseline 6 Phase III and 7 Phase I

R-1 SHOPPING LIST - Item No. 34-1 of 34-4

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 4)

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HXH	EXHIBIT R-2, RDT&E Budget Item Justification	DATE:
		February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	R-1 ITEM NOMENCLATURE
RDT&E, N / BA 4	ADV COMBAT SYS TECH/0603382N	Advanced Combat System Technology /0603382N

- (U) (\$1.112) Enhanced AEGIS Weapon System architecture and performance models using prototype modeling tools, multi-sensor coordination, and advanced tactical information management concepts. Developed and validated enhanced certification techniques that are applicable to the enhanced computing architecture prototyped in FY98.

IN EYOU DI AN:

- (U) (\$1.212) Continue system engineering experiments with currently emerging COTS/DARPA computer technologies to assess improvements in upgrades against previou identified shortfalls. Provide feedback on any existing shortfalls for future enhancements. Work within the commercial standards communities to address the shortfalls in computing capabilities for Navy applications.
 - (U) (\$3.380) Conduct an integrated demonstration in the computing testbed of selected AEGIS Weapon System capabilities focused on second phase QoS functionality in middleware domain. Assess and validate the available certification techniques applicable within the Common CDS functional areas that support object-oriented computer program architectures.
 - systems. Work with the Baseline development teams to identify remaining or emerging issues associated with transition to Baseline 6 Phase III and Baseline 7 Phase I for - (U) (\$1.200) Initiate transition efforts of lessons learned in the FY99 middleware risk reduction experiments targeted at the Common CDS capability for AEGIS combat middleware capabilities.
 - (U) (\$0.998) Validate the performance modeling tools against the existing prototype capabilities in the computing testbed.
- (U) Note: \$0.065 of the efforts described represent the portion of extramural program that is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638,

(U) FY01 PLAN:

- (U) (\$1.295) Continue system engineering experiments with currently emerging COTS/DARPA computer technologies to assess improvements in upgrades against previou identified shortfalls. Provide feedback on any existing shortfalls for future enhancements. Work within the commercial standards communities to address the shortfalls in computing capabilities for Navy applications.
 - (U) (\$3.448) Conduct an integrated demonstration in the computing testbed of selected AEGIS Weapon System capabilities focused on second phase QoS functionality in middleware domain. Assess and validate the available certification techniques applicable within the Common CDS functional areas that support object-oriented computer program architectures.
- (Ú) (\$1.200) Continue integration of lessons learned in the FY00 middleware risk reduction experiments targeted at the Common CDS capability for AEGIS combat system Work with the Baseline development teams to identify remaining or emerging issues associated with transition to Baseline 6 Phase III and Baseline 7 Phase I for middleware capabilities.
 - (U) (\$1.000) Continue validation of the performance modeling tools against the existing prototype capabilities in the computing testbed.

R-1 SHOPPING LIST - Item No. 34-2 of 34-4

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 2 of 4)

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EXHIBIT R	EXHIBIT R-2, RDT&E Budget Item Justification		DATE: February 2000
APPROPRIATION/BUDGET ACTIVITY PDT&E N / RA 4	PROGRAM ELEMENT NAME AND NUMBER ADV COMBAT SYS TECHNOON3382N	R-1 ITEM NOMENCLATURE	Technology /0603
Program Change Summary:			ki Topopoo (Kapunga III)
FY 2000 PRES Budget Submit Appropriated Value:	FY 1999 6.634 6.653	FY 2000 6.828 6.828	FY 2001 12.043
Adjustment to FY 1999/2000 Appropriated value FY2000 President's Budget: FY 2001 PRES Budget Submit:	-0.216 6.437	-0.038 6.790	-5.100 6.943
Funding: FY 1999 funding decrease is due to adjustments (\$-0.038). FY 2001 change is due		g adjustments (\$-0.062).	SBIR reduction (\$-0.154), and minor pricing adjustments (\$-0.062). FY2000 funding decrease is due to minor pricing io a decrease for shifted Navy priorities (\$-1.500), level of effort correction (\$-3.559), NWCF Rate increase (\$+0.046), and

minor pricing adjustments (\$-0.087).

Schedule: Not applicable.

Technical: Not applicable.

								<u>م</u>	Total
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Complete	Cost
RDT&E, N / 1319 / BA 4	175.562	256.120	179.684	194.015	130.676	107.796	82.409	CONT	CONT.
PE0604307									

C. Acquisition Strategy: Risk reduction efforts are lead by NSWC/DD, the AEGIS Combat System Lifetime Support Engineering Agent (LSEA). Results are transitioned to industry for cost and risk mitigation in the production of AEGIS Combat Systems.

D. Schedule Profile: Not Applicable

R-1 SHOPPING LIST - Item No. 34-3 of 34-4

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 3 of 4)

UNCLASSIFIED

								DATE				
Exhibit B-3 Cost Analysis (nage 1)	(1)							İ		February 2000	000	
APPROPRIATION/BUDGET ACTIVITY	Ige 1) VITY	PROGRA	PROGRAM ELEMENT NAME AND NUMBER	IE AND NUMB	ËR	PROJECT NAM	PROJECT NAME AND NUMBER:			i Common		
RDT&E, N / BA 4		ADV CC	ADV COMBAT SYS TECH/0603382N	CH/060338	2N	Advanced (Advanced Combat System Technology /K0324	m Technolog	y /K0324			
Cost Categories	Contract	Performing Activity &	Total PY s	FY 99	FY 99 Award	FY 00	FY 00 Award	FY 01	FY 01 Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Systems Engineering	SS/CPFF			1.729	11/98	1.570	11/99	1.758	11/00	CONT.	CONT.	
Systems Engineering	WR	NSWC, Dahlgren, VA		1.695	12/98	4.002	12/99	3.874	12/00	CONT.	CONT.	
Systems Engineering	WR		MD 0.000	2.000	03/99					CONT.	CONT.	
Subtotal Product Development			14.060	5.424		5.572		5.632		CONT.	CONT.	0.000
Remarks:												
Support	WR	Miscellaneous	0.150	0.255	11/98	0.255	11/99	0.275	11/00	CONT.	CONT.	
Subtotal Support			0.150	0.255		0.255		0.275		CONT.	CONT.	
Remarks:												
Test & Evaluation	WR	Miscellaneous	0000	0.315	11/98	0.325	11/99	0.381	11/00	CONT.	CONT.	
Subtotal T&E			0.000	0.315		0.325		0.381		CONT.	CONT.	
Remarks:												
Program Management Support	WR	Miscellaneous	0.000	0.443	11/98	0.638	11/99	0.655	11/00	CONT.	CONT.	
Subtotal Management			00:00	0.443		0.638		0.655		CONT.	CONT.	
Remarks:												
Total Cost			14.210	6.437		6.790		6.943		CONT.	CONT.	
									:			

R-1 SHOPPING LIST - Item No. 344 of 34-4

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 4 of 4)

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EXHIBIT R-2, RDT&E	JT&E Budget Item Justification	ustification				DATE:	1 40	2000	
APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NON	R-1 ITEM NOMENCLATURE			ual y 2000	
RESEARCH DEVELOPMENT LEST & EVALUATION, NAVY	NAVY/BA-4			Surface and S	hallow Water N	Surface and Shallow Water Mine Countermeasure/0603502N	easure/06035(NZC	
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	76.599	109.765	97.929	121.193	91.245	107.808	88.653	CONT.	CONT.
Remote Minehunting System/Q0260/Q2387	17.417	45.231	45.696	65.252	59.383	65.345	40.020	CONT.	CONT.
Integrated Combat Weapons System/Q1233	10.367	20.011	14.365	9.770	3.373	3.184	3.274	CONT.	CONT.
Shallow Water Mine Countermeasure/Q2131	28.112	15.298	11.730	22.171	11.270	28.010	34.413	CONT.	CONT.
Unmanned Underwater Vehicle/V2094	20.703	29.225	26.138	24.000	17.219	11.269	10.946	CONT.	CONT.
Quantity of RDT&E Articles									

channels, choke points, sea lines of communications and amphibious and other fleet operating areas. It develops: (1) organic remote minehunting capability for DDG-51 Class and other surface combatants; Class, Mine Hunter Coastal (MHC) MHC-51 Class, and other surface ships; (3) systems for neutralizing mines and light obstacles from shallow water, very shallow water, surf zones, and beach landing craft zones in support of amphibious operations; (4) near-term and long-term Unmanned Undersea Vehicle (UUV) systems for clandestine mine reconnaissance.

Note: In accordance with 15 USC 638, \$2.162M in FY 2000 is reserved for the Small Business Innovation Research (SBIR) assessment. A. Mission Description and Budget Item Justification: The program provides for developments to combat the threat of known and projected foreign mines against U.S. Naval and merchant shipping in harbors, (2) the integration and improvement of systems and support for systems which will detect, localize and classify moored, bottom, and close-tethered mines for use in Mine Countermeasure (MCM) MCM-1

B. Program Change Summary:	FY 1999	FY 2000	FY 2001
FY 2000 President's Budget:	73.491	82.465	89.610
Appropriated Value:	73.491	107.465	
Adjustment to FY 1999 Appropriated Value/			
FY 2000 President's Budget:	3.108	27.300	8.319
FY 2000/01 OSD/OMB Budget Submit:	76.599	109.765	97.929

Funding: FY99: (+\$7.000) RMS Acceleration (Cong Add), (+\$.281) BTR Update, (-\$1.393) Midyear Review BTRs, (-\$1.175) SBIR, (-\$.948) Contract Advisory, (-\$.657) General Reductions; FY00; (+10.000) RMS Acceleration, (+\$15,000) ICWS Acceleration, (+\$2.300) LMRS Program Acceleration -UUV; FY01: (+\$6.430) Integrated Combat Weapons System, (+\$2.100) UUV Acceleration of LMRS, (+\$.456) NWCF Rate Adjustment, (+\$.217) Strategic Sourcing redistribution, (-.669) Inflation adjustment, (-.215) General Reductions.

Schedule: RMS - RMS (V)4 MSII occurred in 1Q/00 and RMS (V)4 MSIII will occur in 2Q/05.

R-1 SHOPPING LIST - Item No. 35

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 31)

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	ification				DATE:			
								Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM EL	ELEMENT NAME AND NUMBER	AND NUMBE	R	PROJECT NAI	PROJECT NAME AND NUMBER	3ER			
RDT&E, N/BA-4	Surface & S	Shallow Water MCM, 0603502N	er MCM, 06		Remote Mineh	unting System	Remote Minehunting Systems/Q0260/Q2387	7		
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		17.417	45.231	45.696	65.252	59.383	65.345	40.020	CONT.	CONT.
RDT&E Articles Qty			2							

A. Mission Description and Budget Item Justification: The Remote Minehunting System (RMS), AN/WLD-1(V), program develops a new remotely operated minehunting system for surface ships. This effort includes development and integration of a remote vehicle, mine-hunting sensors, mission command and control, and installation into the DDG-51 Class Flight IIA Baseline 7 and AN/SQQ-89(V)15 Undersea Warfare Combat System.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

- 1. (U) FY 1999 ACCOMPLISHMENTS

- (U) (\$ 4.500) Completed RMS vehicle builder's trials.
 (U) (\$.525) Prepared documentation for Milestone II.
 (U) (\$12.392) Completed System Requirements Review (SRR). Began System Design Review (SDR) efforts, software development, and DDG51 Flight IIA ship integration.

- 2. (U) (\$ 3.510) Complete System Design Review (SDR) [This is a Pre MS II Activity}
 (U) (\$ 27.605) Begin Critical Design and fabrication of Engineering Development Models (EDMs) including Preliminary Design Review (PDR).
 (U) (\$ 4.603) Continue software development
 (U) (\$ 9.503) Continue DDG51 Flight IIA ship integration
 (U) (\$ 9.503) Continue DDG51 Flight IIA ship integration
 (U) (\$ 4.010) Begin critical item testing
 (U) (\$ 4.000) BTR from Q2131

35 R-1 SHOPPING LIST - Item No.

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 2 of 31)

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	EXHIBIT R-	EXHIBIT R-2a, RDT&E Project Justification	roject Justifi	cation			Δ	DATE:	Febru	February 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4	<u>a</u> 0	PROGRAM ELE Surface & Sh	ELEMENT NAME AND NUMBER Shallow Water MCM, 0603502N	IND NUMBER MCM, 0603	502N	ROJECT NAN emote Minehu	PROJECT NAME AND NUMBER Remote Minehunting Systems/Q0260/Q2387	:R 20260/Q238	7	
 4. (U) FY 2001 PLAN (U) (\$24.013) Continue development and fabrication of Engineering Development Models (EDMs), and complete Critical Design Review (CDR). (U) (\$4.433) Continue software development. (U) (\$9.650) Continue DDG51 Flight IIA ship integration (U) (\$7.600) Continue critical item testing 	nrication of En nt. p integration	gineering Devel	lopment Models	s (EDMs), and	complete Criti	cal Design Re	view (CDR).			
B. OTHER PROGRAM FUNDING SUMMARY	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO COMPLETE	TOTAL COST
(U) OPN RMS Line 262200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	36.279	CONT.	CONT.

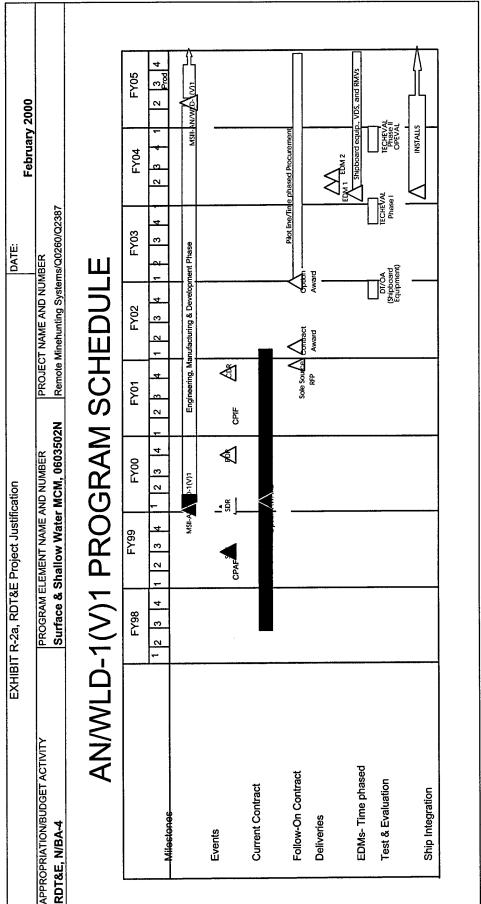
worked with the contractor in an IPT environment to refine the specification and Statement of Work for the overall development effort. The IPT pricing process was used to generate the cost estimates against Navy requirements. The government will pursue commonality between the AN/ AQS-20X airborne minehunting system and the AN/WLD-1(V)1. The AN/WLD-1(V)1 contract plan is for the development of two (2) EDMs, system interactive electronic technical manual (IETM), provisioning data, technical drawings and data, and engineering services. C. Acquisition Strategy: The government has issued a series of contract modifications to Lockheed Martin to complete efforts through the System Design Review. Based upon the approved Milestone II decision the program office issued the contract modification to complete the Critical Design Review (CDR); upon completion of CDR a firm fixed price sole source contract to Lockheed Martin to complete the development, fabrication, and testing of the engineering development models, initial pilot line/tooling, and timed phased procurement of initial systems to meet ship delivery schedules. The government has

D. Schedule Profile: See Attached

R-1 SHOPPING LIST - Item No. 35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 3 of 31)

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R-1 SHOPPING LIST - Item No. 35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 4 of 31)

UNCLASSIFIED

									DATE:				
Exhibit R-3 Cost Analysis (page 1)	ge 1)										February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	LΙ		PROGRAM ELEMENT	LEMENT			PROJECT NA	PROJECT NAME AND NUMBER	3ER				
RDT&E, N . BA-4			Surface &	Surface & Shallow Water MCM, 0603502N	ter MCM, 0		Remote Minet	Remote Minehunting System/Q0260/Q2387	'Q0260/Q2387				
Cost Categories	Contract	Performing		Total				FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Activity &			FY 99		FY 00		FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	Location			Cost				Cost	Date	Complete	Cost	of Contract
Primary Hardware Development	Varions	Various		107.700	5.257	N/A	20.585	12/99	13.653	11/00	CONT.	CONT.	ΑΝ
Ancillary Hardware Development													
Systems Engineering													
Licenses													
Tooling													
GFE													
Award Fees				4.800		Α/N		N/A		ΑN	0.000	4.800	N/A
Subtotal Product Development				112.500	5.257		20.585		13.653				
Remarks:													
Development Support Equipment		TBD										0000	
Software Development	C/CPFF/IF	C/CPFF/IF Lockheed Martin	ţı	2.300	0.400		3.702		3.833		CONT.	CONT.	
Software Development	WR	NSWC, CSS			0.200	N/A	0.901	V/V	0.600	N/A	CONT.	CONT.	N/A
II.S	C/CPFF/IF	- Lockheed Man	tin		0.500		2.800		4.100		CONT.	CONT.	
ILS	WR	WR NSWC, CSS			1.400	N/A	0.200	N/A	0.200	N/A	CONT.	CONT.	N/A
Ship Integration	C/CPFF	Lockheed Martin	ţi						1.500		CONT.	CONT.	
Ship Integration	Various	Varions			2.000		9.503		8.150		CONT.	CONT.	
Subtotal Support				2.300	4.500		17.106		18.383		CONT.	CONT.	
Remarks:													

R-1 SHOPPING LIST - Item No. 35

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 5 of 31)

UNCLASSIFIED

									DATE				
Exhibit R-3 Cost Analysis (page 2)	ige 2)										February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	/ITY		PROGRAM ELEMENT	_			PROJECT NA	PROJECT NAME AND NUMBER	18ER				
RDT&E, N, BA-4			Surface & Shallow Water MCM, 0603502N	w Wate	ir MCM, 06	03502N	Remote Minel	Remote Minehunting Systems/ Q0260/Q2387	ns/ Q0260/Q23	87			
Cost Categories		Performing	Total	_		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Activity &	PY s	<u>i. C</u>	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	\top	Various	145.2	15 370		N/A	010	N/A	7 600	N/A	CONT	TNOO	N/A
Operational Test & Evaluation		Validus					2						
Tooling													
GFE													
Subtotal T&E			15.370	370	0.000		4.010		7.600		CONT.	CONT.	
						:							
Contractor Engineering Support	C/CPFF/IF/L	C/CPFF/IF Lockheed Martin	Ē		4.500		4.570		3.700		CONT.	CONT.	
Government Engineering Support	Various	Varions	32.600	86	2.000	ΝΑ	1.500	N/A	0.600	N/A	CONT.	CONT.	A/A
Program Management Support	i	Various			1.100	ΝΑ	1.400	A/A	1.700	N/A	CONT.	CONT.	N/A
Travel	Various	NAVSEA			090'0	N/A	090'0	N/A	090'0	N/A	CONT.	CONT.	ΑN
Labor (Research Personnel)													
Overhead													
Subtotal Management			32.600	900	7.660		7.530		6.060		CONT.	CONT.	
Remarks:													
Total Cost			162.770		17.417		49.231		45.696				
Remarks: FY 00 requirement is \$49.231M. This requirement is met with \$45.231M control and BTR of \$4.000M.	:49.231M. This	is requirement	t is met with \$45.231M	control a	ind BTR of \$4	F.000M.							
					1								

R-1 SHOPPING LIST - Item No. 35

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 6 of 31)

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ומוהאם	באווטוו ה-צמ, אטו אבי	&E Project Justification	tirication				DATE:			
								Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM EL	ELEMENT NAME AND NUMBER	AND NUMBE	H.	PROJECT NAME AND NUMBER	ME AND NUM	BER			
RDT&E, N/BA-4	Surface & S	Shallow Water MCM, 0603502N	er MCM, 06	03502N		Integrate	Integrated Combat Weapons System/01233/02388	/metsys Suod	01233/O2388	
								2000	2000	
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	EV 2004	EV 2005	EV 2005 Country Complete	()
							1007	2002	enaldilloo oi isoo	I Otal Cost
Project Cost		10.367	20.011	14.365	9.770	3.373	3 184	2 27.A	FACO	Fig
								2.517		200
RDT&E Articles Qty										

Mission Description and Budget Item Justification: (1) Closed Loop Degaussing (CLDG) to improve survivability; (2) ICWS is a series of major, incremental block upgrades to the current combat systems. It provides the MCM/MHC Class Ships an affordable and fully integrated combat weapons system which will improve mission execution efficiency, dramatically reduce life-cycle costs, and facilitate changes to meet future mission requirements. (3) Mine Warfare and Environmental Decision Aids Library (MEDAL) is a software segment on the Global Command and Control System – Maritime (GCCS-M). MEDAL provides mine and warfare planning and evaluation tools and databases to the MCM Commander. (4) Organic MCM C4I connectivity to the rest of the fleet is provided through GCCS-M. Design and implement MIW C4I Surveillance and Reconnaissance (C4ISR) architecture to fully integrate and optimize organic and dedicated systems within the Navy's C4ISR architecture.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

R-1 SHOPPING LIST - Item No. 35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 7 of 31)

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EXHIBI	EXHIBIT R-2a, RDT&E Project Justification	DATE:
		February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	Surface & Shallow Water MCM, 0603502N	Integrated Combat Weapons System/Q1233/Q2388

2. (U) FY 1999 ACCOMPLISHMENTS

(U) CLDG

- (U) (\$1.592) Completed OPEVAL. TECHEVAL and OPEVAL were extended to accommodate ship schedule and ascertain whether range frequency threshold and goal have been met.
 (U) (\$.100) Completed all documentation required for MSIII.
 (U) (\$.103) Conducted MSIII review.

(U) ICWS

- (U) (\$.590) Completed integration of unique SQQ-32 trainer functionality into SSQ-94 trainer.
- (U) (\$.170) Developed in-depth MNV signature knowledge and began development of silencing modifications.
 (U) (\$.250) Completed tasks associated with SLQ-48 obsolescence issues to reduce life-cycle costs.
 (U) (\$3.418) Began software design/code/test for ICWS.

(U) MEDAL

- (U) (\$1.639) Completed Build 7 software development, documentation, and Integration.
 (U) (\$.350) Completed Build 7 test and evaluation.
 (U) (\$.790) Began development of Build 8 Core capabilities, tactical algorithms and software upgrades.
 (U) (\$.250) Began Build 8 platform conversion.
 (U) (\$.315) Continued Systems Engineering.

(U) MCS/MCM Ship Studies

- (U) (\$.500) Initiated study of alternatives to replace or retain MCS-12 (USS INCHON) as the only fleet mine countermeasure support ship. (U) (\$.300) Initiated study of alternatives for follow-on class of surface mine countermeasures ships.

R-1 SHOPPING LIST - Item No.

(Exhibit R-2a, page 8 of 31) Exhibit R-2a, RDT&E Project Justification

UNCLASSIFIED

HXH	EXHIBIT R-2a, RDT&E Project Justification	DATE:
		February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	Surface & Shallow Water MCM, 0603502N	Integrated Combat Weapons System/Q1233/Q2388

3. (U) FY 2000 PLAN

- (U) ICWS
- (U) (\$6.000) Initiate hardware design, integration, and testing. (U) (\$8.000) Initiate software design/code/test for ICWS. (U) (\$1.000) Develop Life Cycle Support plan.

(U) MEDAL

- (U) (\$.300) Conduct build 8 test and evaluation. (U) (\$1.045) Begin Build 9 development (U) (\$.166) Define Build 10 core capabilities definition.

- (U) ORGANIC MCM C4I
 (U) (\$1.700) Develop MIW C4ISR data requirements for data fusion, file format, structure and transmission requirements for (organic/dedicated) MIW systems.
 (U) (\$1.800) Develop and conduct MOD/SIM to optimize organic and dedicated systems.

4. (U) FY 2001 PLAN

(u) ICWS

- (U) (\$2.000) Continue hardware design, integration, and testing. (U) (\$3.500) Continue software design/code/test for ICWS. (U) (\$1.038) Develop ILS update.

(U) MEDAL

- (U) (\$.260) Conduct Build 9 test and evaluation.
 (U) (\$2.413) Begin Build 10 development, and begin testing.
 (U) (\$.200) Continue Systems Engineering.
 (U) (\$.654) Define Build 11 core capabilities and begin algorithm development.

R-1 SHOPPING LIST - Item No.

(Exhibit R-2a, page 9 of 31) Exhibit R-2a, RDT&E Project Justification

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Justif	ication				DATE:	Feb	February 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4	PROGRAM ELEMENT NAME AND NUMBER Surface & Shallow Water MCM, 0603	MENT NAME /	ELEMENT NAME AND NUMBER Shallow Water MCM, 0603502N	1502N	PROJECT NAME AND NUMBER Integrated Co	Integrated	ER Combat We	apons System	ND NUMBER Integrated Combat Weapons System/Q1233/Q2388	
 4. (U) FY 2001 PLAN (cont'd) (U) ORGANIC MCM C4I - (U) (\$1.000) Complete MIW C4I architecture/data requirements development. - (U) (\$1.000) Continue MOD/SIM effort. - (U) (\$1.500) Support MIW systems in implementation of MIW C4ISR architect 	uirements developr	lopment. architecture.								
(U) MCS/MCM Ship Studies - (U) (\$.500) Complete study of alternatives to replace or retain MCS-12 (USS INCHON) (U) (\$.300) Complete study of alternatives for follow-on class of surface mine countermeasures ships.	or retain MCS-12 on class of surface	(USS INCHON)). neasures ships.							
B. OTHER PROGRAM FUNDING SUMMARY (U) OPN (CLDG) Line 262200	FY 1999 0.204	<u>FY 2000</u> 5.764	FY 2001 2.890	<u>FY 2002</u> 5.381	FY 2003 3.300	FY 2004 3.401	<u>FY 2005</u> 3.479	To Complete CONT.	Total <u>Cost</u> CONT.	
(U) OPN (ICWS) Line 262200	12.561	10.399	5.528	6.753	7.949	8.222	8.616	CONT.	CONT.	
C. ACQUISITION STRATEGY										
ICWS is a series of major incremental upgrades to the current systems. The original equipment manufacturers have teamed to develop the changes. FY 98 and FY 99 tasks were accomplished under existing BOAs. MEDAL is an evolutionary program with a development cycle of one year per software build.	current systems. Ti development cycle	he original equ of one year pe	ipment manufa r software builc	acturers have 1.	teamed to de	velop the char	iges. FY 98	and FY 99 ta	sks were accomplished un	<u></u>

D. SCHEDULE PROFILE

See attached

R-1 SHOPPING LIST - Item No. 35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 10 of 31)

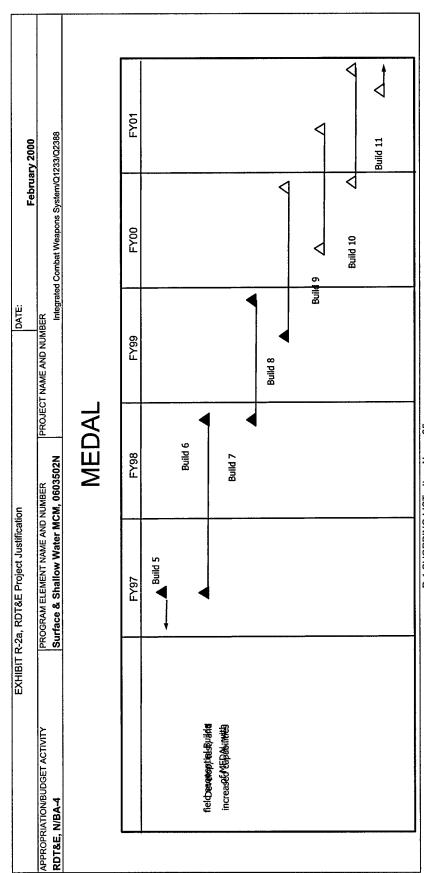
CLASSIFICATION:

EXHIE	EXHIBIT R-2a, RDT&E Project Justification	ustification		DATE:	February 2000	000
APPROPRIATION/BUDGET ACTIVITY		ME AND NUMBER	PROJECT NAME AND NUMBER	ND NUMBER		
RDT&E, N/BA-4	Surface & Shallow W	Shallow Water MCM, 0603502N		Integrated Combat Weapons System/Q1233/Q2388	apons System/Q1233	Q2388
		MIW C4I				
	FY00	FY01	FY02	FY03	FY04	FY05
Document MCM System Sensor Data Characteristics		DATA REQUIREMENTS FOR (ORG. REQUIREMENTS FOR (ORG.	DATA REQUIREMENTS FOR (ORGANIC/DEDICATED) MIW SYSTEMS REQUIREMENTS FOR (ORGANIC/DEDICATED) MIW SYSTEMS	TURE AND TRANSMISSION		
Assess With NAVO/ID Specific Data Characteristics			DEVELOP AND CONDUCT	DEVELOP AND CONDUCT MODISIM TO OPTIMIZE ORGANIC AND DEDICATED SYSTEMS	ND DEDICATED SYSTEMS	
			СОМРЕТЕ	COMPLETE MIW INFO SYSTEM ENGINEERING REPORT	EPORT	
				SELECT SYS	SELECT SYSTEM DATA STANDARDS	
	•		4	ЕЛИГЛИ	EVALUATE MALEMENTATION STRATEGY/RECD COA	RECTD COA
Evaluate Ability of MIW C4ISR Architecture in GCCS-M/T-21 Environment		4		SUPPORT MIW SYSTEMS IN IMFLEMENTATION OF MIW CAISR ARCHITECTURE	EMENTATION OF MIW CAISR AR	житестике
			DESIGNINSTALLTEST ANCM SYSTEMS	MCM SYSTEMS		4
			COMPLETE MIW C41 ARCHITE	COMPLETE MIW CAI ARCHITE)TUREDATA REQUIREMENTS DEVELOPMENT DESIGNAINSTRALTRES SMCM. SY	REQUIREMENTS DE/ELOPMENT DESIGNINSTALL/FIST SMCM SYSTEMS	

R-1 SHOPPING LIST - Item No. 35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 11 of 31)

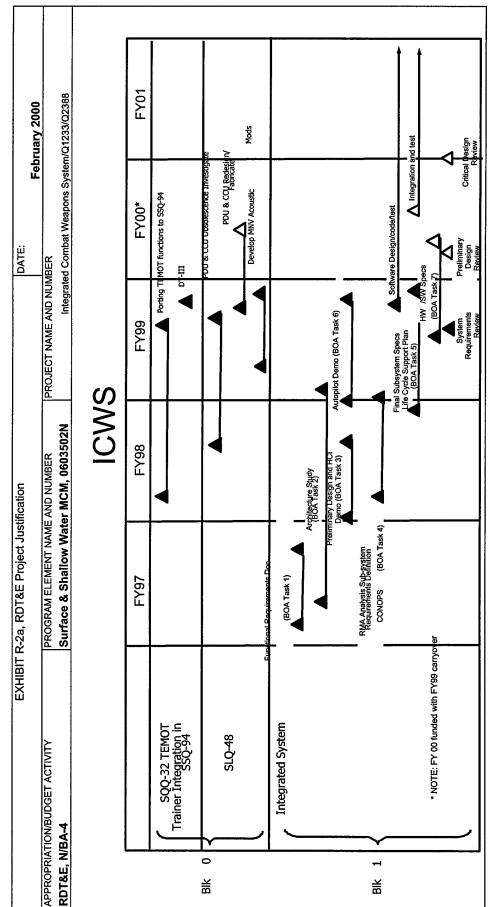
CLASSIFICATION:



R-1 SHOPPING LIST - Item No. 35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 12 of 31)

CLASSIFICATION:



35 R-1 SHOPPING LIST - Item No.

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 13 of 31)

UNCLASSIFIED

FY04 4x24 Integrated Combat Weapons System/Q1233/Q2388 February 2000 FY03 Production & Deployment Phase FY02 FRP Delivery (13) FY01 \$ Production DATE: OT.⊒E FOT&E FY00 PROJECT NAME AND NUMBER WS III (Sept) 3 OPEVA FY99 TECHEVAL **€** Ě **FY98** FY98 (Mar.) (July.) (Jan.) E& MD Phase FY97 88 **FY97** EDM Surface & Shallow Water MCM, 0603502N (Sep)(Oqt) FY96 FY96 EDM (Apr) CLDG (May) PROGRAM ELEMENT NAME AND NUMBER (Jan EDM EXHIBIT R-2a, RDT&E Project Justification ***** FY95 488 (Feb 4 FY94 **4** Prototype FY92 FY93 8 16X2 FY91 (Fig. APPROPRIATION/BUDGET ACTIVITY Formal Solicitation Release Egginact Award or DT & E / OT & E Enginecring Tests RDT&E, N/BA-4 Deliveries Milestones

R-1 SHOPPING LIST - Item No. 35

: Matriol Support Date
- Operational Testing & Evaluation
- System Design Review
- To be determined

OT&E SDR SDR TBD

- Scitical Ansiran Pestifis - Developmental Testing & Evaluation - Empiricating Manufacturity Development - Engineering Sevelopment Wildelt - Manorandum of Understanding

OT & E

NOTES:

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 14 of 31)

UNCLASSIFIED

			1						DATE:				
Exhibit R-3 Cost Analysis (page 1)	e 1)										February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	≥		PROGRAM ELEMENT	EMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E, N/BA-4			Surface & Shall	shallow Wa	llow Water MCM/0603502N	03502N			Integrated Co	mbat Weapons	Integrated Combat Weapons System/Q1233/Q2388	2388	
Cost Categories	Contract	Contract Performing		Total		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Method Activity &		ΡΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	& Type Location	-	Cost	Cost	Date	Cost	Date		Date	Complete	Cost	of Contract
Primary Hardware Development	CPAF	Raytheon			09.70	11/98	6.000	04/00	2.000	11/00	CONT.	CONT.	N/A
Ancillary Hardware Development													
Systems Engineering	Various	NSWC, CD/NRAD, SD	SAD, SD	0.100	1.115	11/98	1.700	11/99	2.000	11/00	CONT.	CONT.	ΝΆ
Licenses													
Tooling													
GFE													
Award Fees													
Subtotal Product Development				0.100	1.875		7.700		4.000		CONT.	CONT.	

Remarks:

Development Support Equipment											0.000	
Software Development	Various	Various NSWC, CSS	0.300	5.507	11/98	10.900	04/00	7.062	11/00	CONT.	CONT.	ΑN
Training Development	Various	Various NSWC, CD		0.000	N/A	0.000		0.000		CONT.	CONT.	
Integrated Logistics Support	CPAF	CPAF Raytheon, Ri		0.250		1.000		1.038		CONT.	CONT.	
Configuration Management	Various	Various		0.000	N/A	0.000		0.000		CONT.	CONT.	
Technical Data	Varions	Various		0.100	N/A					CONT.	CONT.	
GFE												
Subtotal Support			0.300	5.857		11.900		8.100		CONT.	CONT.	

Remarks:

R-1 SHOPPING LIST - Item No. 35

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 15 of 31)

UNCLASSIFIED

								DATE:				
Exhibit R-3 Cost Analysis (page 2)	ge 2)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	ΙΙΛ	PRO	PROGRAM ELEMENT			PROJECT N	PROJECT NAME AND NUMBER	BER				
RDT&E, N/BA-4		Sur	Surface & Shallow Water MCM/0603502N	ater MCM/06	303502N	Integrated Co	Integrated Combat Weapons System/Q1233/Q2388	s System/Q123	33/Q2388		·	
Cost Categories	Contract	5	Total		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Activity &	ΡΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Developmental Test & Evaluation	CPFF	SAIC, VA	0.200	0.000	11/98	0.000	11/99	0.000	11/00	Cont.	0.200	ΑN
Operational Test & Evaluation	WR	NSWC, CD		1.592	N/A						1.592	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			0.200	1.592		0.000		0.000		0.000	1.792	
Contractor Engineering Support	WR	NSWC, CD/CSS		0.153	N/A	0.100		1.298			1.551	
Government Engineering Support	WR	NSWC, CSS		0.500	N/A	0.200					0.700	
Program Management Support	WR	NSWC, CSS/NUWC		0.290	N/A	0.111	N/A	0.967	N/A	Cont.	1.368	ΑN
Travel				0.100							0.100	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	1.043		0.411		2.265		0.000	3.719	
Remarks:												
Total Cost			009:0	10.367		20.011		14.365				
Remarks:												
			R-1 SHO	R-1 SHOPPING LIST - Item No.	- Item No.	35						

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 16 of 31)

UNCLASSIFIED

EXHIBI	EXHIBIT R-2a, RDT&E Project Justification	Project Jus	ification				DATE:			:
								Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	EMENT NAME	AND NUMBE	R	PROJECT NA	PROJECT NAME AND NUMBER	BER			
RDT&E, N/BA-4	Surface & S	Shallow Water MCM, 0603502N	er MCM, 06	03502N			Assault Breaching Systems/Q2131	ing Systems/C	22131	
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004		FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		28.112	15.298	11.730	22.171	11.270	28.010	34.413	CONT.	CONT.
RDT&E Articles Qty										
			tailed he mailter	0.00	iola out	ole observer	24 60 00	4 4 c 4 c c 4 4 c		

A. Mission Description and Budget Item Justification: This program provides for a combination of joint US Marine Corps and US Navy projects planned to counter the threat to amphibious landing forces from known and projected foreign land and sea mines and light obstacles in the shallow water, very shallow water and surf zone approaches to amphibious assault areas. It develops systems for mine sweeping and explosive the Distributed Explosives Technology (DET), Shallow Water Assault Breach System (SABRE) and follow-on P3I efforts.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

R-1 SHOPPING LIST - Item No. 35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 17 of 31)

UNCLASSIFIED

EXHIB	EXHIBIT R-2a, RDT&E Project Justification		DATE:
			February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	IBER
RDT&E, N/BA-4	Surface & Shallow Water MCM, 0603502N		Assault Breaching Systems/Q2131
1. (U) FY 1999 ACCOMPLISHMENTS			
(U) DET - (U) (\$2.338). Completed DT-II			
- (U) (\$1.260) Completed safety testing (U) (\$1.249) Completed system procurement preparation (U) (\$1.338) Conducted OT-II (U) (\$.262) Preparation for MSIII.	ution.		
(U) SABRE - (U) (\$1.050) Continued safety testing. - (U) (\$.375) Continued DT-II - (U) (\$.375) Continued system procurement preparation. - (U) (\$1.475) Continued OT-II - (U) (\$.262) Began MSIII preparation.	tion.		
 (U) (\$6.004) Began Extended Range DET Rocket development (U) (\$5.158) Began Fire Control System (FCS) development. (U) (\$5.821) Began SABRE Fuze upgrade. (U) (\$.190) Completed Autonomous controller development. (U) (\$.059) Portion of extramural program is reserved for Small 	 (U) EN (U) (\$6.004) Began Extended Range DET Rocket development (U) (\$5.158) Began Fire Control System (FCS) development. (U) (\$5.821) Began SABRE Fuze upgrade. (U) (\$.190) Completed Autonomous controller development. (U) (\$.059) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638. 	cordance with 15 USC 638.	

R-1 SHOPPING LIST - Item No. 35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 18 of 31)

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	DATE:	
			February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	Surface & Shallow Water MCM, 0603502N	Assault	Assault Breaching Systems/Q2131
2. (U) FY 2000 PLAN			
(U) SABRE - (U) (\$2.712) Complete fabrication of DT/OT-II systems. - (U) (\$.385) Complete DT-II - (U) (\$.264) Complete system procurement preparation. - (U) (\$.650) Complete OT-II. - (U) (\$.465) Complete safety testing. - (U) (\$.178) MSIII.	-		
 (U) EN (U) (\$2.184) Continue Extended Range DET Rocket development and engineering tests. (U) (\$1.815) Continue FCS development and engineering tests. (U) (\$2.845) Complete SABRE Fuze upgrade. (U) (\$4.000) BTR to Q0260. 	welopment and engineering tests. ng tests.		
3. (4) FY 2001 PLAN			
 U) EN (U) (\$6.703) Continue SZA P3I development and engineering tests. (U) (\$5.027) Continue FCS development and engineering tests. 	eering tests. ng tests.		

R-1 SHOPPING LIST - Item No. 35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 19 of 31)

UNCLASSIFIED

<u>U</u>	EXHIBIT R-2a, RDT&E Project Justification	RDT&E P	roject Justif	ication				DATE:	Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROC	SRAM ELEN	AENT NAME	PROGRAM ELEMENT NAME AND NUMBER		PROJECT NAM	PROJECT NAME AND NUMBER	ER			
RDT&E, N/BA-4	Surf	Surface & Sha	allow Water	Shallow Water MCM, 0603502N		Assault Breachi	Assault Breaching Systems/Q2131	2131			\neg
B. OTHER PROGRAM FUNDING SUMMARY					i i						
ш	FY 1998 FY	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	TO COMPLETE	TOTAL COST	
(U) OPN (SWMCM Line 262400	0.000	7.256	18.708	16.863	37.863	19.769	7.696	8.485	CONT.	CONT.	
C. Acquisition Strategy: Complete development of DET, SABRE and the Auto Pilot task of EN and transition to production. Improve the capabilities of DET and SABRE by developing the Surf Zone Array (SZA), and the Fire Control System (FCS) tasks of EN.	nt of DET, SABR	E and the A	uto Pilot task	of EN and trar	sition to prod	uction. Improv	e the capabiliti	ies of DET a	nd SABRE by	developing the Surf Zone Arr	á
D. Schedule Profile											
See attached											
									-		
Name Road											
			GGCTO V C	D 4 CHODDING LIST Itom No		35					

R-1 SHOPPING LIST - Item No. 35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 20 of 31)

UNCLASSIFIED

			EXHIBIT R	EXHIBIT R-2a, RDT&E Project Justification	Project Jus	tification				DATE:	Eohri	Fahrishy 2000	
APPROPRIATION/BUDGET ACTIVITY	ET ACTIVIT	>		PROGRAM EL	EMENT NAM	ELEMENT NAME AND NUMBER		PROJECT NAME AND NUMBER	IE AND NUME	ER		aly zooo	
RDT&E, N/BA-4				Surface & S	hallow Wat	& Shallow Water MCM, 0603502N		Assault Breaching Systems/Q2131	ng Systems/Q	2131			
			77.50	T. A. Die	96 (4	40.41	110.00	0.0	100 %	11.6	(1 8. %)		N. 18
Distributed Explosive Technology	hnology		CONCEPT	×						Not	Not Complete Complete		
MILESTONES		√ 5		D&V	,				1	4	New		
			REBASELINE	MS-I		ENGINEERIS AND I	ENGINEERING MANUFACTURING AND DEVELOPMENT	SING	F				
					MS-II					PR	PRODUCTION (Through FY07)	rough FY07)	
									MS III		IOCTBD		
EVENT				SRR	SDR PDR CDR	CDR		WSESRB					
FORMAL SOLICITATION RELEASE	TION				Long lead det cord	cord		RFP Release	ease				
						EMD Contract RFP	RFP						
CONTRACT AWARD	- 0				Long lead det cord	cord	L		Full Production contract Award	contract Award			
				(l Fuze Delivery (43)	(3)			
				EMD & Fuze Contract	ontract	•			EMD Delivery (24)	(24)			
									SystemTECHEVAL	SVAL			
DT&E/OT&E			DT-0	DT-I Deploy	DT-I DT-IL. DT-ILL Deployment & Explosive Tests	Dr-IIA h	DT-IIB/OT-IIA	Fuza	 FuzeTECHEVAL 				
	Explosive Selection Tests						Interoperability	OT-III □ - OT-III 	TRE OT-IIB (OPEVAL)				

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 21 of 31)

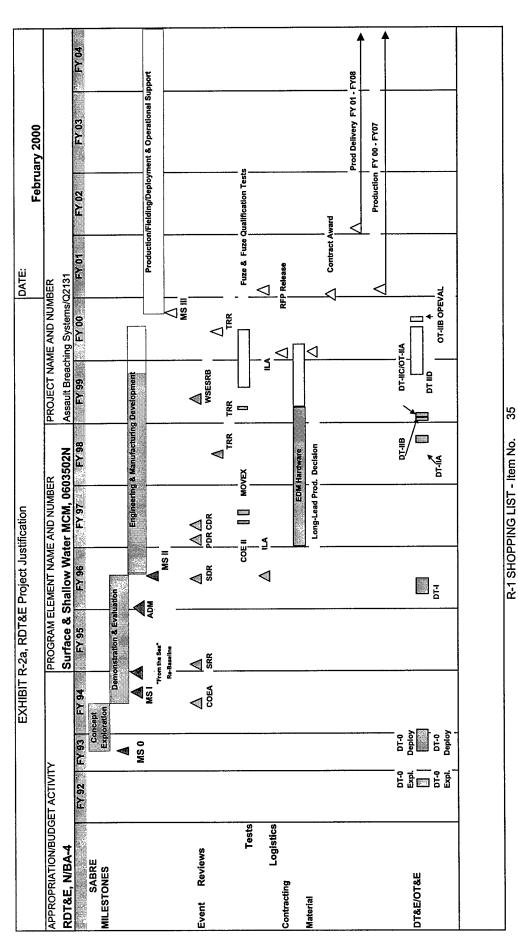


Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 22 of 31)

	EXHIBIT R-2a, RDT&E Project Justification	: Justification		DATE: Eshriary 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT I	ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER		
RDT&E, N/BA-4	Surface & Shallow	Surface & Shallow Water MCM, 0603502N	Assault Breaching Systems/Q2131	22131	
	FY 97 FY 98 FY 99	B FY 00 FY 01	FY 92 FY 03.	FY 04 FY 05	
<u>M</u>	SZ MID TERM	M	Mid-term P3I Development		
<u>(E</u>	(Explosive Neutralization (EN))				
	_ ·	SABRE Fuze Upgrade		•	
			à.	P3I Acquisition Decision	
	Extended Range DET Rocket	Rocket Mo	Rocket Motor Design Development & Test	ts.	
	-				
		Fire Contro	Fire Control Design Development & Test		
<u> jo</u>	SZ FAR TFRM				
		·	SZ AOA Sz	SZ System Design (Acq New Start)	
			_		
			MSI		
<u>m</u>	BEACH ZONE FAR TERM	Hydra-7 Concept Development (1)		BZ System Design (Acq New Start)	
			 - 		
1	EN ATD BZA Development (1)		BZ AOA MS I		
			Ц		
ξ	(1) These tasks are funded by ONB.				

	R-1S	R-1 SHOPPING LIST - Item No.	35	in the state of th	

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 23 of 31)

UNCLASSIFIED

									DATE:				
Exhibit R-3 Cost Analysis (page 1)	je 1)										February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	Ł	PRC	PROGRAM ELEMENT	F			PROJECT N	PROJECT NAME AND NUMBER	ABER				
RDT&E, N/BA-4		ns Sn	Surface & Shallo	ow Wate	low Water MCM/0603502N	3502N			Assa	ult Breaching S	Assault Breaching Systems/Q2131		
Cost Categories	Contract	Contract Performing	Total			FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Method Activity &	ΡΥs	<u></u>	FY 99	Award	FY 00	Award	_	Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost	<u> </u>	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Primary Hardware Development	WR	IH, CSS, TBD	40	10.200	8.900	N/A	2.300	A/N	4.800	N/A	CONT.	CONT.	N/A
Ancillary Hardware Development	WR	IH, CSS, TBD	7.	100	1.000	N/A	0.500	A/A	0.650	N/A	CONT.	CONT.	N/A
Systems Engineering	٧R	IH, CSS	13	13.000	2.000	A/A	0.500	A/A	0.300	N/A	CONT.	CONT.	N/A
Licenses	۸ĸ	N/A	·0	0.800	0.000		0000		0000		0.000	0.800	
Tooling	WR	IH, CSS, TBD	0	0.800	090'0	A/N	0.200	N/A	0:020	N/A	CONT.	CONT.	N/A
GFE	WR	H, CSS	2	2.600	0.500	ΑN	1.400	A/A	0.200	N/A	CONT.	CONT.	N/A
Award Fees	ΑN	N/A	Ö	0.500	0.000		0.000		0.000		0.000	0.500	
Subtotal Product Development			99	65.000	12.460		4.900		6.000		0.000	88.360	

Remarks: This is a combination of DET, SABRE and EN P31 work for FY99. There is more than one performing activity for most cost categories. Award dates are N/A because tasks are performed by government activities.

Development Support Equipment	WR	IH, CSS, TBD	9.500	2.221	ΑN	1.000	N/A	0.900	A/A	CONT.	CONT.	N/A
Software Development	WR	CSS	5.000	3.037	A/A	1.300	N/A	0.300	N/A	CONT.	CONT.	N/A
Training Development	WR	IH, CSS	1.500	0.500	N/A	0.300	A/A	0.300	N/A	CONT.	CONT.	N/A
Integrated Logistics Support	WR	IH, CSS	1.500	0.600	A/A	0.200	N/A	0.200	A/A	CONT.	CONT.	A/A
Configuration Management	WR	IH, CSS	1.500	1.900	N/A	0.300	N/A	0.100	N/A	CONT.	CONT.	N/A
Technical Data	₩.	IH, CSS	0.800	1.500	N/A	1.100	N/A	0.300	N/A	CONT.	CONT.	N/A
GFE	WR	IH, CSS	0.200	0.200	N/A	0.100	N/A	0.000		0.000	0.500	N/A
Subtotal Support			20.000	9:958		4.300		2.100		CONT.	CONT.	

Remarks: NOTE: Award dates are N/A because tasks are performed by government activities.

R-1 SHOPPING LIST - Item No. 35

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 24 of 31)

CLASSIFICATION:

								DATE:				
Exhibit R-3 Cost Analysis (page 2)										February 2000	00	
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT	LEMENT			PROJECT N/	PROJECT NAME AND NUMBER	/BER				
RDT&E, N/BA-4		Surface & Shall	Shallow Wat	low Water MCM/0603502N	103502N			Assa	ult Breaching \$	Assault Breaching Systems/Q2131		
	Contract Performing		Total		FY 99		FY 00		FY 01			
r System/Item	Method Activity &		ΡΥs	o	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
	& Type Location		Cost	Cost	Date	Cost	Date		Date	Complete	Cost	of Contract
Developmental Test & Evaluation WR	IH, CSS, TBD	780	19.500	1.400	N/A	0.850	N/A	2.000	N/A	CONT.	CONT.	N/A
Operational Test & Evaluation WR	IH, CSS, TBD	780	7.000	1.000	A/A	0.100	N/A	0.000	N/A	CONT.	CONT.	N/A
Tooling	IH, CSS, TBD	. BD	0.500	0.200	N/A	0.100	N/A	0.200	N/A	CONT.	CONT.	N/A
GFE	IH, CSS, TBD	180	0.300	0.100	N/A	0.050	N/A	0.100	N/A	CONT.	CONT.	N/A
Subtotal T&E			27.300	2.700		1.100		2.300		CONT.	CONT.	

Remarks: NOTE: Award dates are N/A because tasks are performed by government activities.

Contractor Engineering Support	WR	IH, CSS, TBD	2.000	0.200	A/N	0.100	N/A	0.100	N/A	CONT.	CONT.	N/A
Government Engineering Support	WR.	IH, CSS	2.000	1.000	N/A	0.200	N/A	0.300	N/A	CONT.	CONT.	ΝΑ
Program Management Support	WR	IH, CSS, NAVSEA	7.200	1.694	N/A	0.598	N/A	0.830	N/A	CONT.	CONT.	N/A
Travel	W.	NAVSEA	0.600	0.100	N/A	0.100	N/A	0.100	N/A	CONT.	CONT.	N/A
Labor (Research Personnel)	ΑN	N/A									0.000	
Overhead	¥	N/A									0.000	
Subtotal Management			14.800	2.994		0.998		1.330		CONT.	CONT.	

Remarks:

Total Cost

Remarks: FY 00 requirement is \$11.298M. This requirement is met with \$15.298M control and BTR of -\$4.000M.

R-1 SHOPPING LIST - Item No. 35

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 25 of 31)

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification	2, RDT&E Bu	dget Item Ju	ustification				DATE:			
		•						Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NO	R-1 ITEM NOMENCLATURE				
RESEARCH DEVELOPMENT TEST & EVALUATI	VALUATION, NAVY/BA-4	3A-4	;		Surface and S	hallow Water A	Aine Counterm	easures Progr	Surface and Shallow Water Mine Countermeasures Program Element (PE) 0603502N	03502N
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Total PE Cost		20.703	29.225	26.138	24.000	17.219	11.269	10.946	CONT.	CONT.
										CONT.
Project Cost (V2094)		20.703	29.225	26.138	24.000	17.219	11.269	10.946	CONT.	CONT.
Quantity of RDT&E Articles		1 - NMRS				1 - LMRS				

A. Mission Description and Budget Item Justification:

This project was completely restructured in FY 1994 in response to Congressional direction provided in the FY 1994 DOD Appropriations Act. Specifically, the office of the Secretary of Defense and the Navy were directed to (1) establish priorities among various proposed UUV programs, (2) focus on near-term mine countermeasures issues, and (3) establish affordable, cost-effective programs. The Navy developed an overall UUV Program Plan, which was approved by ASN(RD&A) June 1994, endorsed by USD(A&T) and forwarded to Congress to support FY 1995 budget deliberations.

surveillance, intelligence and factical oceanography missions as priority three; and exploring advanced UUV designs for the future as priority four. FY 1995 Congressional language complimented the The UUV Program Plan establishes a clandestine, near-term mine reconnaissance capability as the Navy's top UUV priority; a long term-mine reconnaissance system as priority two; the conduct of Vavy Plan and fully supported priorities one and two starting in FY 1995.

Mine Reconnaissance System (LMRS) is being developed to provide a robust, long-term Fleet capability to conduct clandestine minefield reconnaissance. Several Long-Term Mine Reconnaissance Systems will be procured beginning in FY 2003. The Navy vill develop a Multi-Mission UUV from an SSN-688 class submarine capable of mine detection, classification, and localization. One NMRS Operational Prototype (OP) system was made available to the Commander Submarine Development Squadron-Five in FY 1999. No further production of the NMRS is planned. Since the NMRS is viewed as a stop-gap capability with a life expectancy of approximately 6 years, the AN/BLQ-11 Long-Term The UUV project funds development of the first three priorities of the UUV Program Plan. The Near-Term Mine Reconnaissance System (NMRS) is a minehunting UUV system launched and recovered (MMUUV) system that is capable of performing different missions. It is envisioned that this system will use the same vehicle energy section and structure of the LMRS, but will have payload sensors appropriate to meet various mission requirements. The Near-Term Mine Reconnaissance System (NMRS) program has developed and tested one operational prototype system. The NMRS was made available to the Fleet and will remain available for Fleet use until delivery of the first LMRS. In accordance with N87 letters Ser N87/9U657190 of 26 July 1999 and Ser N87/9U657196 of 27 July 1999, all remaining RDT&E funding for NMRS has been applied to the LMRS program.

The Long-Term Mine Reconnaissance System (LMRS) is currently in development. The fabrication of a prototype system will begin in FY01. This prototype system will support test and evaluation, and then in FY03 will transition to fleet operations

B. (U) Program Change Summary: (show total funding, schedule, and technical changes for the program element that have occurred since the last submission).

unding:

FY99 reductions reflect: -,050 for Sec, 8108 Revised Economic, -,010 for Civilian Personnel, -,308 for Sec. 8054 Contract Advisory, -,099 for Inflation Savings, -,508 for

SBIR/STTR Transfer, -.085 for BSO 1002 Actual Update Nov99, -.003 for FY1999 BTRs.

FY01 reductions of -,390 are for congressional undistributed reductions. FY01 increases reflect: +,327 for Restore of Issue 62288 Outsourcing, +,115 for NWCF Rates, FY00 reductions reflect: -,051 for SSP. FY00 increases reflect: +,051 for Restore of Issue 62288 Outsourcing, +2,300 for NMRS Program Completion.

+2.100 for Reduction of NMRS O&MN funding, +.008 for PBD411 ICC, +.004 for PBD604 Mil/Civ Pay Rates

Schedule:

Fechnical:

No technical program changes.

MMUUV moved out one year because \$2.300 was transferred into LMRS for completion of LMRS R&D.

R-1 SHOPPING LIST - Item No. 35

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 26 of 31)

UNCLASSIFIED

		PROJECT NAME AND NUMBER Unmanned Undersea Vehicle V2094	:R /2094		
Surface and Shallow Water Mine Countermeasures Program Element (PE) 0603502N DST (\$ in Millions) FY 1999 FY 2000 FY 2001		ndersea Vehicle	/2094		
COST (\$ in Millions) Program Element (PE) 0603502N FY 1999 FY 2000 FY 2001		-			
COST (\$ in Millions) FY 1999 FY 2000 FY 2001					
20.703 29.225 26.138	FY 2001 FY 2002	FY 2003	FY 2004 FY 2	FY 2005 Cost to Complete	Total Cost
	26.138 24.000	17.219	11.269 10.946	346 CONT.	CONT.
RDT&E Articles Qty 1-NMRS		1-LMRS	-		

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1999 Accomplishments:

(U) (6.106) Priority 1 (NMRS): Conducted Interim Training (in water) and SSN Testing. Completed preparations for fleet availability of the Prototype System. Turned system over to COMSUBDEVRON FIVE.

(U) (14.597) Priority 2 (LMRS): Completed LMRS Detailed Design and conducted the LMRS Critical Design Review. Commenced preparations for award of the LMRS Development Phase contract. Conducted product development risk mitigation testing.

1. (U) FY 2000 Plan:

(U) (29.225) (LMRS): Award development contract and begin development phase.

1. (U) FY 2001 Plan:

(U) (26.138) (LMRS): Continue development phase and begin fabrication of prototype system.

R-1 SHOPPING LIST - Item No. 35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 27 of 31)

UNCLASSIFIED

	EX	IIBIT R-2a, F	EXHIBIT R-2a, RDT&E Project Justification	ct Justificati	L0			DATE:	February 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4		<u> </u>	PROGRAM ELEMENT NAME AND NUMBER Surface and Shallow Water Mine Countermeasures	MENT NAME /	ND NUMBER e Countermea		PROJECT NAME AND NUMBER Unmanned Undersea Vehicle V2094	3ER V2094	
		ă	Program Element (PE) 0603502N	t (PE) 0603502	N.				
 b. Other Frogram Funding Summary. 		,					To	Total	
OPN PE 0204281N: Line Item 217100	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005 Complete	Cost	
	0.0	0.0	0.0	0.0	25.0	52.6	48.4 CONT.	CONT.	
OMN PE 0204281N 1R7B // MPS)	C	0	0	00	0.7	5.7	64 CONT	CONT	
LAZD (LAMAS)	2 6						C. CONT.	CONT.	
ID3D (NIMRS)	0.0	9	9	8	2	3		COLUT:	
NMRS O&MN funding has been realigned to LMRS RDT&E,N funding in accordance with N87 letters Ser N87/9U657190 of 26 July 1999 and Ser N87/9U657196 of 27 July 1999.	MRS RDT&E,	N funding in ac	cordance with	N87 letters Ser	- N87/9U65719	30 of 26 July 19	66		

competition during system development. In FY97 three one year contracts were awarded for development of preliminary design. In early FY98, two of the preliminary design contrctors were selected to continue C. Acquisition Strategy: One Operational Prototype NMRS has been procured via sole source contract. No further NMRS production is planned. The LMRS acquisition strategy is structured to maximize selected to complete the LMRS design, fabricate a prototype system and support in-water testing. Procurement of the LMRS will be sole source to Boeing. A competitive procurement is not cost effective development through a critical design review. Selection of these two contractors was based primarily on the contractor's performance during the preliminary design contract. In early FY00, Boeing was due to the limited (6-12) number of systems planned for procurement.

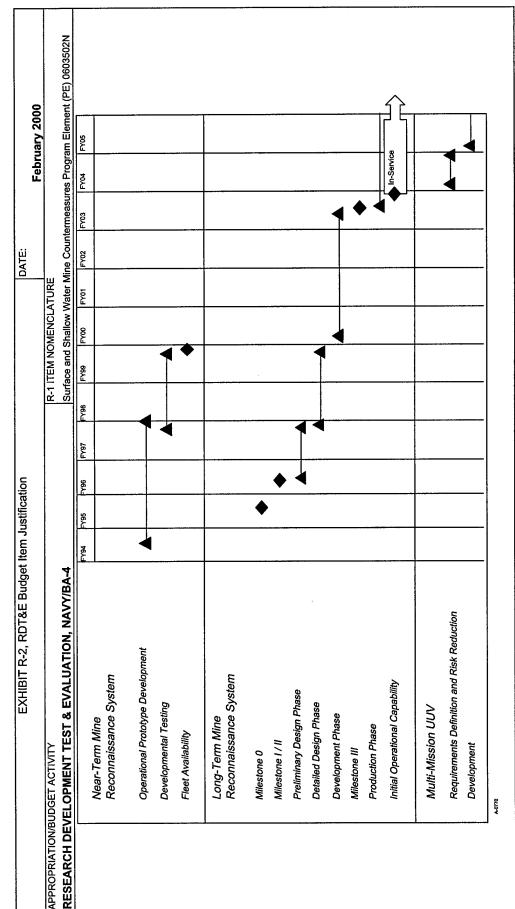
The MMUUV project will use competitive procurement to award an RDT&E contract for the development and prototyping of the system. Procurement and operation is not planned within the FYDP.

D. Schedule Profile: See next page.

R-1 SHOPPING LIST - Item No. 35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 28 of 31)

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R-1 SHOPPING LIST - Item No. 35

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 29 of 31)

UNCLASSIFIED

								DATE:	1			
Exhibit R-3 Cost Analysis (page 1)										February 2000	00	
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	IBER		i.		
RDT&E, N/BA-4		Surface and	Surface and Shallow Water Mine Countermeasures	Mine Counten	neasures	Unmanned Ur	Unmanned Undersea Vehicle V2094	e V2094				
		Program Element (PE)		D603502N		_						
Cost Categories	Contract	Performing	Total		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item Requirements)	Method & Type	Activity &	PY s	FY 99 Cost	Award	FY 00 Cost	Award	FY 01 Cost	Award Date	Cost to	Total	Target Value of Contract
are Development (NMRS)	SS/CPAF	NGC	44.554	1.269	A/N					0.000	45.823	
Award Fees (NMRS)			3.047	0.669	N/A					0.000	3.716	
(NMRS)	SS/CP	NGC	1.987	1.837	N/A					0.000	3.824	
pment (LMRS)		NGC and Boeing										
Detailed Design Contract	CPAF	North America	19.876	10.109	ΑN.					0.000	29.985	
Award Fees (LMRS Design)			0.575	0.266	ΑΝ					0.000	CON .	
Primary Hardware Development (LMRS) Development Contract	CPAF	Boeind				23.588	11/99	20.226	Ą.	CONT	CONT	
Award Fees (LMRS Development)						1.539	A/N	1.168	A/N	CONT.	CONT.	
Gov't Facilities Costs (LMRS Development)	ent)					0.848	N/A	1.444	A/A	CONT.	CONT.	
Ancillary Hardware Development												
System Engineering												
Licenses												
Tooling												
Subtotal Product Development			70.039	14.150		25.975		22.838		CONT.	CONT.	
Remarks:			(
Davalopment Sumont Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Engineering Technical Services												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												· · · · · · · · · · · · · · · · · · ·
			1000	Tol 1 Olyloc	5 4 SHODDING LIST HOW NO. 36	u						

R-1 SHOPPING LIST - Item No. 35

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 30 of 31)

UNCLASSIFIED

									DATE:			A TOTAL AND A	
Exhibit R-3 Cost Analysis (page 2)	32)										February 2000	000	
APPROPRIATION/BUDGET ACTIVITY	<u> </u>		PROGRAM ELEMENT				PROJECT N	PROJECT NAME AND NUMBER	ABER				
		<u>-,,</u>	Surface and Shallow Water		Mine Countermeasures	neasures	Unmanned U	Unmanned Undersea Vehicle V2094	le V2094				
RDT&E, N/BA-4		-	Program Element (PE) 0603502N	ant (PE) 0603.	502N								
		<u>_</u>		Total		FY 99		FY 00		FY 01	:		
, or System/Item		Activity &		ΡΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
-	8	Location			Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Ę.	WR	Various							0.225		CONI.	CONI.	
Operational Test & Evaluation													
Tooling													
GFE				0000	000		0000		100		1400	H	
Subtotal 1 & E				0.000	0.000		0.000		0.223		CON .	CON	
Contractor Engineering Support	CPAF .	JHU/APL, ARL/UT, SGT, Drape	JT, SGT, Drape	4.808	1.357	N/A*	0.000	N/A	0.350	N/A*	CONT.	CONT.	
ų	Γ	Various		10.621	4.262	N/A	2.841	N/A	2.185	N/A	CONT.	CONT.	
	Various	Various		2.460	0.875	N/A	0.363	N/A	0.500	A/A	CONT.	CONT.	
Program Management Personnel													
Travel					0.059	ΝΆ	0.046	ΝΆ	0.040	N/A	CONT.	CONT.	
Labor (Research Personnel)													
Overhead													
Subtotal Management				17.889	6.553		3.250		3.075		CONT.	CONT.	
Remarks: * Multi-year contracts incrementally funded; therefore; Award Date is N/A.	crementally	/ funded; theref	'ore; Award Da	ite is N/A.									
Total Coet				87 928	20 703		29.225		26.138		CONT	CONT	
Total Cost				0.50	20.102		227.02		20. 100				
Remarks:													
						100000000000000000000000000000000000000							

R-1 SHOPPING LIST - Item No. 35

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 31 of 31)

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification	2, RDT&E B	udget Item J	ustification				DATE:			
		,						Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOI	R-1 ITEM NOMENCLATURE				
RESEARCH DEVELOPMENT TEST & EVALUATI	VALUATION, NAVY / BA 4	BA4			Surface Ship	Torpedo Defe	Surface Ship Torpedo Defense / 0603506N - Subhead C4NZ	 Subhead C 	4NZ	
COST (\$ in Millions	FY 1998	FY 1999	FY 2000	FY 2000 FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Total PE Cost	0.000	4.840	4.614	0.000	0.000	0.000	0.000	0.000	0.000	9.454
Joint US/UK Surface Ship Torpedo Defense V2045	0.000	4.840	3.978	0.000	0.000	0.000	0.000	0.000	0.000	8.818
Surface Ship Torpedo Defense V0225	0.000	0.000	0.636	0000	0.000	0.000	0.000	0.000	0.000	0.636

For holds a figure and the recent Demonstration/Validation (D&V) phase of the program, such as the mobile expendable acoustic decoy, concept schools as the mobile expendable acoustic decoy, concept schools are the mobile expendable acoustic decoy, concept schools are the mobile expendable acoustic decoy. Wissign Description and Budget Line Justification: Project V2045 continues a joint collaborative program with the United Kingdom to develop future one countermeasures, improved torpedo detection classification and localization, and improved performance of the AN/SLQ-25A in shallow water/ littoral regions. Project V0225 continues the AN/SLQ-25A winch and tow upgrade efforts.

Note: In accordance with 15 USC 638, \$.09M in FY 2000 is reserved for the Small Business Innovative Research (SBIR) assessment.

- 1. (U) FY 1999 Accomplishments:
- (\$2.340) Developed an AN/SLQ-25A Winch and Tow Upgrade to Improve Performance in Littoral, Shallow Water Operations.
- (\$0.900) Completed the Mobile Ship-Launched Countermeasure Acoustic Device (MSCAD) D&V Phase by conducting an end-to-end In Water Demonstration Test.
- (\$0.750) Developed a structured, impartial evaluation system and evaluated Future Technologies to Improve the Performance of the Detection Classification, and Localization (DCL) Processing Component of Surface Ship Torpedo Defense. The Technologies Selected will be Available for Implementation into the DCL Torpedo Recognition and Alertment Functional Subsystem (TRAFS) Component of the AN/SQQ-89 System.
- to Force Applications Which Would Focus on the Protection of Large Deck Ships Against Torpedo Attacks. Conducted Studies of Area Torpedo (\$0.850) Conducted Large Deck Ship Study to Evaluate Present and Potential Concepts and Technologies. These Concepts May Be Used Defense Concepts. Developed an improved scattering mechanism for Concept 1
- 2. (U) FY 2000 Plan:
- (\$0.636) Follow-On to AN/SLQ-25A Winch and Tow Upgrade Efforts.
 - (\$1.478) Complete AN/SLQ-25A Winch and Tow Littoral PECP.
- (\$1.000) Define Tripwire Program Per Large Deck Study.
 - (\$1.000) Perform DCL Improvements.
- (\$.250) Conduct Concept One Feasibility Study.
 - (\$.250) Develop ATT Processor.

R-1 SHOPPING LIST - Item No. 37 - 1 of 37 -3

(Exhibit R-2, page 1 of 3)

Exhibit R-2, RDT&E Budget Item Justification

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification		DATE: February 2000
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVEL OPMENT TEST & EVALUATION, NAVY	R-1 ITEM NOMENCLATURE Surface Ship Torpedo Defe	t-1 ITEM NOMENCLATURE Surface Ship Torpedo Defense / 0603506N - Subhead C4NZ
3. (U) FY 2001 PLAN: - (\$0)		
B. Progam Change Summary:		
	FY 1999 FY 2000 5.000 0.640 5.000 0.640	FY 2001 0.000
Adjustment to FY 1999/2000 Appropriated Value FY 2000 President's Budget: FY 2001 PRES Budget Submit:	-0.160 3.974 4.840 4.614	0.000
Funding: FY 1999: Revised Economic Assumptions (-\$.011), SBIR/STTR Transfer (-\$.126), and Inflation Savings (-\$.023) FY 2000: Undistributed congressional reductions (-\$.026) and congressional add for the Cooperative International Program (\$4.000) FY 2001: Not Applicable.), and Inflation Savings (-\$.0 Id for the Cooperative Interns	23) itional Program (\$4.000)
Schedule: Not Applicable		
Technical: Not Applicable		
C. Other Program Funding Summary:		
OPN BLI: 217600/217605/217606 Undersea Warfare Support Equipment		C.P.
FY 1999 FY 2000 FY 2001 FY 2002 FY 2003 FY 2004 0 0 11.540 .847 4.266 3.847	FY 2005 Complete 17 6.961 6.547	-:
R-1 SHOPPING LIST - Item No. 37 - 2 of 37 - 3	Jo. 37 - 2 of 37 - 3	

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 2 of 3)

UNCLASSIFIED

DATE: February 2000	R-1 ITEM NOMENCLATURE Surface Ship Torpedo Defense / 0603506N - Subhead C4NZ							
EXHIBIT R-2, RDT&E Budget Item Justification	APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY	D. Acquisition Strategy: Not Applicable	E. Schedule Profile: Not Applicable.					

R-1 SHOPPING LIST - Item No. 37 - 3 of 37 - 3

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 3 of 3)

UNCLASSIFIED

APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY						DAIE:	Febr	February 2000	
	AVY / BA 4			R-1 ITEM NON Carrier System	R-1 ITEM NOMENCLATURE Carrier Systems Development - 0603512N	ıt - 0603512N			
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	105.787	141.957	148.952	156.631	70.759	76.726	75.949	Cont.	Cont.
S1722 CV Weapons Elevator Improvements	0.750	1.020	1.052	1.067	1.064	1.082	1.114	Cont.	Cont.
42208 Future CV R & D	18.742	111.040	122.521	128.428	57.468	63.534	58.479	Cont.	Cont.
42678 CVN Technology Insertion	48.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	48.400
42693 Carrier Systems Definition	34.243	24.529	14.362	13.088	0.000	0.000	0.000	Cont.	Cont.
W1723 CV Launch & Recovery Systems	1.600	1.829	6.805	13.177	12.227	12.110	16.356	Cont.	Cont.
W2269 EAF Matting	2.052	3.539	4.212	0.871	0.000	0.000	0.000	0.000	18.512
Quantity of RDT&E Articles									

A. Mission Description and budget item Justification: This Navy unique program addresses all technology areas associated with Navy/Marine Corps aircraft operations aboard ships. The program includes:

- (U) (S1722) Development of standardized, supportable and maintainable aircraft carrier weapons elevators components.
- (U) (42208 formerly 22208) Development of ship hull, mechanical, propulsion, electrical, aviation and combat support systems, subsystems and components to significantly improve aircraft carrier affordability, survivability and operation of existing and future aircraft carriers.
- (U) (42678) -- Development of technologies for transition from CVN77 to CVNX, for demonstrating enhanced capabilities for CVNX, and for mitigating CVNX cost or technical risk.
- (U) (42693 formerly S2693) Supports post Milestone 0 ship system technical definition and initial cost estimates through studies for various ship alternatives being considered in the Analysis of Alternatives (AOA). The project supports interim Operational Requirements Document (ORD) preparation and develops the primary supporting documentation for Milestone I decision.

R-1 SHOPPING LIST - Item No. 38-1 of 38-33

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 33)

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification	DATE:
	February 2000
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA 4	Carrier Systems Development - 0603512N

- (U) (W1723) Development of all systems required to provide approach and landing guidance and control, recovery, service, support and launch aircraft operating onto or from ships. Payoffs include increased safety, greater sortie generation rates, enhanced aircraft boarding rates, reduced manning, increased aircraft service life and fleet modernization.
- (U) (W2269) -- Development of Lightweight Mat and Expeditionary Arresting Gear for use at Marine Corps Expeditionary Airfields (EAF).
- (U) NOTE: FY 2000 total PE amount contains (\$3,215) which is the portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

I B. Program Chande Summary.			
	FY 1999	FY 2000	FY 2001
(U) FY 2000 President's Budget:	109.208	142.783	138.976
(U) Appropriated Value:	109.208	142.783	
(U) Adjustment to FY 99/00 Appropriated Value/FY 2000 PRESBUDG	-3.421	-0.826	9.976
(U) FY 2001 PRES Budget Submit:	105.787	141.957	148.952

Funding:

FY99 change (\$-3.421)

(\$-2.678) SBIR reductions, (\$-.590) Inflation savings and various adjustments, (\$-.153) (\$1722) Recoupment of Future Carrier Below Threshold Reprogramming.

FY00 change (\$-.826) (\$-.788) Across-the-board reductions, (\$-.038) (42208) Strategic Sourcing Redistribution.

FY01 change (+9.976)

(\$-3.197) Final Rebalancing and various adjustments (\$-789) Strategic Sourcing Redistribution.

(\$-.868) (42208) Offsets required to finance high priority O&M,N deficiencies.

(\$12.000) (42208) Rephase Smart Carrier

(\$2.830) (W1723) Reflects programmatic increase for CROV and AAGE.

Schedule: (U) W1723 – The deferral of the VISUAL program Milestone II from 4th quarter FY99 to 2nd quarter FY00 are due to delays in developing, coordinating, and finalizing program documentation. Also, funding realignments driven by emergent, higher priority requirements retarded development efforts, deferring the EDM award by three months (1Q to 2Q FY00) and delaying RFP release by two quarters (2Q to 4Q FY99).

Technical: Not applicable,

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(Exhibit R-2, page 2 of 33) Exhibit R-2, RDT&E Budget Item Justification

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	EXHIBIT R-2a, RDT&E Project Justification	tification				DATE:			
							Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY PROGRAM	PROGRAM ELEMENT NAME AND NUMBER	E AND NUMBE	K.	PROJECT NAME AND NUMBER	ME AND NUM	BER			
RDT&E, N / BA 4 Carrier Systems	Systems Develo	Development - 0603512N		CV Weapons Elevator Improvements S1722	Elevator Improv	rements S1722			•
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost	0.750	1.020	1.052	1.067	1.064	1.082	1.114	Cont.	Cont.
RDT&E Articles Qty									

A. Mission Description and Budget Item Justification

This project provides for advanced development, fabrication, test, evaluation and documentation of standardized aircraft carrier weapons elevators components such as control systems, hoist machinery, doors and hatches. Emphasis is placed on the reduction of total ownership cost, improvement of safety, reliability, maintainability and watertight integrity and weight reduction.

- (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 1999 ACCOMPLISHMENTS:

(U)(\$.240) – Conducted investigation and engineering analysis for integration of multiple controllers into Control Net.

(U)(\$.200) – Procured linear actuators. (U)(\$.210) – Completed development and test of embedded sensors in conjunction with Programmable Logic Controller (PLC). (U)(\$.100) – Installed linear actuators on Land Based Engineering Site (LBES) test site.

FY 2000 PLAN:

(U)(\$.150) - Complete linear actuator tests.

(U)(\$.075) - Complete alternative governor research.

(U)(\$.165) – Complete alternative governor testing. (U)(\$.330) – Develop intelligent controls for multiple car systems. (U)(\$.300) – Complete linear drive ropeless elevator research.

FY 2001 PLAN:

(U)(\$.387) – Complete design for model ropeless elevator. (U)(\$.300) – Develop simulation model for multiple cars in non-traditional trunk. (U)(\$.165) – Investigate reconfigurable power supplies. (U)(\$.200) – Develop design for non-traditional trunk installation at LBES.

38-3 of 38-33 R-1 SHOPPING LIST - Item No.

(Exhibit R-2a, page 3 of 33) Exhibit R-2a, RDT&E Project Justification

UNCLASSIFIED

	EXHIBIT R-28	EXHIBIT R-2a, RDT&E Project Justification	DATE: February 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA 4		PROGRAM ELEMENT NAME AND NUMBER Carrier Systems Development - 0603512N	PROJECT NAME AND NUMBER CV Weapons Elevator Improvements S1722	
B. Other Program Funding Summary: Not applicable	ımary: Not applicable			
C. Acquisition Strategy: Not applicable	plicable			
D. Schedule Profile.	FY 1999	FY 2000	FY 2001	
Program Milestones	3Q Completed Multiple PLC Investigations	2Q Complete Alternative governor research 4Q Complete linear drive ropeless elevator research	3Q. Complete design for ropeless elevator	
Engineering Milestones		3Q Develop intelligent multiple car controls	4Q Develop simulation model for multiple cars 2Q Investigate reconfigurable power supplies 4Q Develop design for non- traditional trunk at LBES	
T&E Milestones	3Q Completed embedded sensor tests	1Q Complete linear actuator test 4Q Complete alternative governor test		
Contract Milestones	3Q Procured linear actuator			
		R-1 SHOPPING LIST - Item No.	38-4 of 38-33	;

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 4 of 33)

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				Target Value	or Contract	Cont.							Cont.										
00						Cont.							Cont.		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
February 2000				Cost to	Complete	Cont.							Cont.									0.000	
		2	FY 01	Award	Date	12/00																	
DATE:	3ER	ements S172		FY 01		1.052							1.052									0.000	
	E AND NUME	evator Improv				12/99																	
	PROJECT NAME AND NUMBER	CV Weapons Elevator Improvements S1722		FY 00		1.020							1.020									0.000	
	ā			Award		12/98																	
		Carrier Systems Development - 0603512N	F	FY 99 Aw		0.540							0.540									0.000	
	AENT	ns Develop	Į e į				0.821						0.821									0.000	
	PROGRAM ELEMENT	rier Syster	Total	γγ																			
	PRO	Carı	Performing	Activity &	Location	NSWC Philadelphia	Misc																
(F et)			Contract P		╗	WR	2																
Exhibit R-3 Cost Analysis (page 1)	APPROPRIATION/BUDGET ACTIVITY	RDT&E, N / BA 4	Cost Categories	, or System/Item		are Development	Ancillary Hardware Development	Systems Engineering	Licenses	Tooling	GFE	Award Fees	Subtotal Product Development	Remarks:	Development Support Equipment	Software Development	Training Development	Integrated Logistics Support	Configuration Management	Technical Data	GFE	Subtotal Support	Remarks:

R-1 SHOPPING LIST - Item No. 38-5 of 38-33

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 5 of 33)

UNCLASSIFIED

								DATE				
Exhibit R-3 Cost Analysis (page 2)	e 2)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	≥	PROGRAM ELEMENT	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	ABER				
RDT&E, N / BA 4		Carrier Sy	Carrier Systems Development - 0603512N	lopment - 0	603512N	CV Weapons	Elevator Impr	CV Weapons Elevator Improvements S1722	22			
stem/Item		Performing Activity &	Total PY s	FY 99	FY 99 Award	FY 00	FY 00 Award	FY 01	FY 01 Award	Cost to	Total	Target Value
	& Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Test & Evaluation		NSWC Philadelphia	0.000	0.210	12/98	0.000				Cont.	Cont.	Cont.
	1										0.000	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			0.000	0.210		0.000		0.000		Cont.	Cont.	Cont.
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			0.821	0.750		1.020		1.052		Cont.	Cont.	
Remarks:												**************************************
			P-1 CHO	P-1 SHODDING LIST - Itam No.	- Item No	38_6 of 38_33	33					

R-1 SHOPPING LIST - Item No. 38-6 of 38-33

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 6 of 33)

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	ification				DATE:	Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA 4	PROGRAM ELEMENT NAME AND NUMBER Carrier Systems Development - 0603512N	EMENT NAME tems Develo	AND NUMBE	1512N	PROJECT NAME AND NUMBER Future Carrier R&D - 42208	ME AND NUM R&D - 42208	3ER			
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		18.742	111.040	122.521	128.428	57.468	63.534	58.479	Cont.	Cont.
RDT&E Articles Qty								1.		

A. (U) Mission Description and Budget Item Justification

subsystem design capabilities not currently feasible. This project transitions the most promising technologies from the Navy technology base, other government laboratories, and the private sector into specific This project provides for the development of aircraft carrier specific technologies, the infusion of the surface ship technology base into existing and future aircraft carriers and the potential realization of advanced development efforts. All systems developed in this project have the potential to support emerging requirements and other promising systems technologies for insertion into new aircraft carrier The emphasis is directed toward developing ship hull, mechanical, propulsion, electrical, aviation and combon systems, sub-systems and components to significantly improve aircraft carrier affordability, survivability, and operational capabilities and to meet the requirements of existing and pending regulations and statutes critical to the operation of future aircraft carriers.

-(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 1999 ACCOMPLISHMENTS:

- (U) (\$18.742) Propulsion Plant Development
- (U) (\$1.600) Developed preliminary propulsion plant functional requirements. Commenced development of plant component arrangements, including size and weight of structural members and required shielding. Initiated sizing of major plant component foundations.
- (U) (\$2.000) Initiated early stages of heat exchanger detailed design, including shock and sizing analyses, to reduce weight and cost while meeting power output requirements.
- (U) (\$1.500) Developed initial fluid system functional requirements. Began developing fluid system schematics, descriptions and diagrams. Undertook preliminary main coolant pump hydraulic motor
- (U) (\$1.600) Started description of functional requirements for instrumentation and control systems and equipment. Began developing advanced propulsion plant control and automation schemes with analysis of manpower cost.

R-1 SHOPPING LIST - Item No. 38-7 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 7 of 33)

UNCLASSIFIED

	EAHIBIT K-za, KDT&E Project Justification	DATE:	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER		
RDT&E, N / BA 4	Carrier Systems Development - 0603512N	Future Carrier R&D - 42208		

- (U) (\$4.130) Determined preliminary electric system functional requirements. Performed electrical plant computer modeling and analysis. Established turbine generator power rating and voltage, and did conceptual design. Initiated development of procurement specifications. Identified electric plant interface constraints and began refining layout concepts to ensure compatibility with NIMITZ hull form.
- (U) (\$3.200) Developed preliminary steam plant performance and functional requirements. Established structural member sizes for major steam plant component foundations. Identified steam plant interface constraints and began refining layout concepts to ensure compatibility with the NIMITZ hull form.
- (U) (\$4.712) Began identifying potential impacts of new propulsion plant systems on hull and watertight bulkhead penetrations. Began developing and integrating non-propulsion mechanical systems with the propulsion plant including water purification; potable water; fire main and other fire fighting systems; heating, ventilation, and air conditioning; and ship service air systems. Assessed preliminary sizing of emergency generator support systems.

FY 2000 PLAN:

- (U) (\$45.300)-Non-Nuclear Propulsion Plant Development
- (U) (\$15.900) Begin preliminary turbine generator design, develop testing requirements and identify required testing capabilities for a prototype unit. Produce turbine generator schematic diagrams identifying all ship and system connections.
- (U) (\$5.800) Integrate Non-Propulsion equipment into the Steam and Electric Equipment layouts. Determine major system requirements and performance criteria and provide information for the integrated product model. Establish non-propulsion systems interface requirements with propulsion plant and power distribution systems.
- (U) (\$7.000) Continue developing enhancements to the product data management software and prototype automated workflow for construction deliverables. Develop design analysis features required for propulsion plan design development.
- (U) (\$16.600) Begin developing conceptual designs for optimized mechanical and electrical systems that interface with the propulsion plant. Establish interface controls between propulsion and non-propulsion equipment. Develop optimal volume and weight requirements for these mechanical and electrical systems. Establish layout of doors, ladders, passageways, hatches, and escape trunks integrated with the optimal propulsion plant.

R-1 SHOPPING LIST - Item No. 38-8 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 8 of 33)

UNCLASSIFIED

DATE:	February 2000	ABER		
		PROJECT NAME AND NUMBER	N Future Carrier R&D - 42208	
R-2a, RDT&E Project Justification	•	PROGRAM ELEMENT NAME AND NUMBER	Carrier Systems Development - 0603512N	
EXHIBIT R-2a		APPROPRIATION/BUDGET ACTIVITY	RDT&E, N / BA 4	

- facility and utility requirements. Complete architectural and engineering design. Initiate site construction. Initiate ATL Ship Integration Effort. Identify space and service allocation requirements for integration reduced length, launcher systems. Validate System Specification. Initiate system engineering, technology assessment, and risk mitigation efforts. Conduct candidate energy storage, power electronics, control system and launch engine technology testing. Complete System Design Review and allocate Configuration Item performance requirements. Develop Configuration Item performance specifications. Complete - (U) (\$34.616) - Aircraft Launch, Recovery & Support - Advanced Technology Launcher (ATL) Program Definition and Risk Reduction (PDRR) phase. Develop two, prototype, full size, fully integrated. Preliminary Design Review, initiate detailed design and development of product specifications. Initiate development of ATL Test Facility. Conduct site surveys and environmental impact studies. Identify in CVN-68 class baseline hull. Prepare preliminary arrangement drawings identifying structural and arrangements impacts. Develop other hull, mechanical, and electrical system requirements
- Advanced Shock Isolation of Equipment. Develop performance requirements for Advanced Damage Control System (ADCS). Commence fire vulnerability study in support of initiatives targeted at reducing operation and support costs of related systems. Commence development of enhanced damage control and firefighting concepts. Characterize topside threats for Topside Survivability. Characterize threats and evaluate use of explosive load reduction and anti-fratricide shielding protection techniques in support of Sympathetic Detonation Suppression System (SDSS) development. Commence development of capabilities. Improve Hull Girder analytic capability as part of Weapons Damage & Residual Strength analysis. Define design, producibility and material property goals for General Protective Plate and improved weapons effects codes for Advanced Survivability Assessment Model (ASAP) and the application of finite element and hydro codes to provide enhanced modeling and simulation support for . (U) (\$4.577) - Battle Damage Prevention & Recovery - Initiate evaluation and development of Upgraded Armor Protection System - Littoral (UAPS - Littoral), Dynamic Armor Protection System (DAPS). Underwater Protection System (UWPS), and New Torpedo / Mine Side Protection System (New T/MSPS). Define threats and design goals. Develop preliminary system designs and determine installation feasibility within ship concept designs. Develop plans for procurement and development of scaled test components. Prepare test facilities for small scale testing. Commence refinement of analytical development of advanced passive survivability features
- (U) (\$1.384) Manpower and Material Support Initiate development of manpower and material support alternatives to achieve manpower reductions and total ownership cost savings. Included will be the development of advanced robotics for ship systems and components operation, maintenance and material handling in the areas of combat and intelligence, logistics and Hull Mechanical & Electrical (HIM&E). A standardized open system architecture approach will be incorporated into system and component development.
- reducing the operational and support costs of the ship's war fighting systems. Initiatives remain focused on reducing the number of systems through the use of "multi-function" "volume search" radars and flat planar antenna arrays, data exchange across operational areas, data fusion, and integrated displays for operators. Complete trade studies, including those that result in cost reductions without degrading operational performance into the design development. Evaluate and complete competitive Combat Systems Integration design development and integrate into the ship contract data package. Commence - (U) (\$20.817) - Combat and Intelligence Systems - Complete Phase II competitive solicitation for Combat Systems Integration concepts and design process. Continue monitoring improvements targeted at Phase III Design Refinement. Refine Combat Systems Integration design and integrate into the ship design.
- (U) (\$4.346) Systems Development Support CVNX Engineering Team for design, engineering and interoperability analysis to support Milestone I. Also support for Requirements and AOA Teams for TOC reductions/analysis, survivability analysis and CVNX Advanced Launch & Recovery, and trade studies and Lethality Studies (ORD Specific). Provide acquisition planning support.

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 9 of 33)

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EXHIE	EXHIBIT R-2a, RDT&E Project Justification	DATE:	February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N / BA 4	Carrier Systems Development - 0603512N	Future Carrier R&D - 42208	

FY 2001 PLAN:

- (U) (\$50.767) Non-Nuclear Propulsion Plant Development
- (U) (\$18.130) Continue preliminary turbine generator and main propulsion turbine design, development of testing requirements and identification of testing capabilities, and start prototype development.
- (U) (\$6.270) Determine changes to and complete layout of major electric plant equipment such as load centers outside of propulsion plant spaces. Continue development of inputs to the integrated product model database. Refine interface requirements for the non-propulsion systems with the propulsion and power distribution systems.
- (U) (\$7.840) Continue prototyping and implementation of automated workflow for construction deliverables. Continue developing specialized analysis software required for propulsion plant design development and continue adding design data to the database.
- (U) (\$18.527) Complete preliminary designs and continue development of mechanical and electrical systems that interface with the propulsion plant. Finalize optimal layout of non-propulsion plant mechanical and electrical systems and assess preliminary volume and weight data.
- Recommend system changes to optimize launcher for ship installation and operation. Develop recommended configurations for auxiliary system enhancements required for launcher installation based on prototype design effort. Develop electrical power and distribution system requirements in support of CVNX-1 engineering plant development. Initiate detailed arrangement and system design proposals to - (U) (\$46.745) - Aircraft Launch, Recovery & Support - Continue Advanced Technology Launcher (ATL) Program Definition and Risk Reduction (PDRR) phase. Complete prototype long lead configuration item product specifications. Complete prototype long lead configuration item product specifications. Conduct Critical Design Review on prototype long lead configuration items and initiate procurement/manufacture of Advanced Technology Launcher Program Definition and Risk Reduction phase systems. Continue construction of Advanced Technology Launcher Land Based test Facility. Conduct ship integration trade studies. Identify impacts of candidate launcher configurations on CVN-68 class baseline hull. support Advanced Technology Launcher integration.

R-1 SHOPPING LIST - Item No. 38-10 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 10 of 33)

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification		DATE:
			February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	BER
RDT&E, N / BA 4	Carrier Systems Development - 0603512N	Future Carrier R&D - 42208	
- (U) (\$7.300) – Battle Damage Prevention & Recovery – Develop plan and commence procurement / construction c of analytical capability in conjunction with UWPS developm Continue refinement of analytical capability in conjunction girders / models as part of Weapons Damage & Residual Commence small scale testing of Advanced Shock Isolatic concepts. Continue development of enhanced damage α concepts. Complete fire vulnerability study in support of Survivability protection concept development. Develop pla	Commence procurement and development of scaled test of large scale test components. Commence small scale it ment. Commence small scale testing of candidate UWPS nuith New T/MSPS development. Commence small scale all Strength analysis. Develop plan and commence procur ion of Equipment concepts. Assess ship design impacts control and firefighting concepts, including ADCS and portaf firefighting concept development. Conduct characterizating for scaled testing of staged ordnance concept. Continuation	t components for UAPS – Littors esting of DAPS concepts. Com- concepts. Continue assessme e testing of candidate T/MSPS rement of substructure test con of candidate shock isolation con of candidate shock isolation con able sensors. Commence equipation tests and develop improvinue development of improved v	- (U) (\$7.300) – Battle Damage Prevention & Recovery – Commence procurement and development of scaled testing of DAPS concepts. Commence scaled testing of DAPS concepts. Commence procurement / construction of large scale test components. Commence small scale testing of DAPS concepts. Commence design of DAPS components. Continue refinement of analytical capability in conjunction with UWPS development. Commence small scale testing of candidate UWPS concepts. Continue assessment of ship design impacts due to these candidate concepts. Continue refinement of analytical capability in conjunction with New T/MSPS development. Commence small scale testing of candidate T/MSPS concepts. Develop plan and commence small scale testing of candidate T/MSPS concepts. Develop plan and commence small scale testing of candidate spart of Weapons Damage & Residual Strength analysis. Develop plan and commence procurement of substructure test components for analyzing General Protective Plate concepts. Commence small scale testing of Advanced Shock Isolation of Equipment concepts, including ADCS and portable sensors. Commence equipment identification (including COTS) for candidate Concepts. Commence damage control and firefighting concepts, including ADCS and portable sensors. Commence equipment identification (including COTS) for candidate Survivability protection concept development. Develop plans for scaled testing of staged ordinance concept. Continue development of improved weapons effects, finite element and hydro codes to provide
enhanced modeling and simulation support for development of advanced passive survivability reatures.	int of advanced passive survivability features.		

- (U) (\$2.000) Manpower and Material Support Continue development of manpower and material support alternatives which will achieve manpower reductions and total ownership cost savings. Develop advanced robotics for ship systems and components operation, maintenance and material handling in the areas of combat and intelligence, logistics and HM&E. Continue development of the standardized open systems architecture.
- (U) (\$3.709) Systems Development Support CVNX Engineering Team for design, engineering and interoperability analysis to support overall CVNX Design Development. Also support for Requirements and an Analysis Teams for TOC reductions/analysis, survivability analysis and CVNX Advanced Launch & Recovery, and trade studies and Lethality Studies. Provide acquisition planning
- (U) (\$12.000) Smart Carrier The Smart Carrier program is a PEO Carriers' initiative involving the introduction of information technology, automation and controls, and process improvements with the goal of reducing total workload, lowering total ownership cost (TOC), and enhancing quality of life. Evaluate New technologies for potential workload reductions, support advance planning and integrated work package development, and process reengineering efforts on prototype carrier.

R-1 SHOPPING LIST - Item No. 38-11 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 11 of 33)

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EXHII	3IT R-2a, RD	EXHIBIT R-2a, RDT&E Project Justification	tification			DATE:	February 2000	y 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM	M ELEMENT NAMI	ELEMENT NAME AND NUMBER	PRO	PROJECT NAME AND NUMBER	JMBER		
RDT&E, N / BA 4	Carrier Sy	Systems Devel	stems Development - 0603512N		Future Carrier R&D - 42208	38		
B. Other Program Funding Summary							To To	Total
FY 1999 Related RDT&E:	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	omplete	Cost
0604567N/42301 CV Contract Design 33.294	35.271	38.311	25.394	24.113	25.789	27.458	CONT	CONT
0603570N/S2692 Advance Nuclear Power System 0.000	68.687	99.212	104.800	142.352	132.321	119.880	688.000	1,355.252
Related SCN: 200100 Carrier Replacement Program 122.897	749.601	4,075.522	146.826	428.159	1,323.287	128.834	CONT	CONT
C. <u>Acquisition Strategy</u> : The Carrier acquisition strategy for CVN77 and follow-on hulls is to utilize a phased design and technology insertion or "evolutionary" strategy. This strategy will focus on combat system redesign (topside) on CVN77, new propulsion plant and Advanced Technology Launcher on CVNX-1 and hull distributive systems and functional arrangements on the CVNX-2. On each hull, core capabilities will be maintained and Total Ownership Costs will be reduced in accordance with Carrier goals. As with past NIMITZ class carriers, the CVN77 will be awarded as a sole source Fixed Price Incentive Fee (FPIF) contract to Newport News Shipbuilding. For CVNX-1 and future hulls, various contracting methods are being considered.	legy for CVN77 plant and Advai costs will be rediliding. For CVN	and follow-on hulls nced Technology L uced in accordanc IX-1 and future hulls	is to utilize a phas- auncher on CVNX: se with Carrier goal s, various contractil	sed design and -1 and hull dist. is. As with past ng methods are	technology insertion ributive systems and t NIMITZ class carrie being considered.	or "evolutionary" functional arranç ırs, the CVN77 w	strategy. This str. gements on the C\ ill be awarded as	ategy will focus on combat VNX-2. On each hull, core a sole source Fixed Price
D. Schedule Profile:		FY 1999			FY 2000		FY 2001	
Program Milestones		CVNX: 4C	CVNX: 4Q AoA PART III		CVNX: 2Q MS1			
Engineering Milestones					ATL: 2Q SRR ATL: 40 PDR	*	ATL: 3Q CDR	
T&E Milestones								
Contract Milestones				*	ATL: 1Q PDRR Phase	•		

R-1 SHOPPING LIST - Item No. 38-12 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 12 of 33)

UNCLASSIFIED

								DATE:				
Exhibit R-3 Cost Analysis (page 1)	₽									February 2000	0	
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT	ELEMENT		i	PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E, N / BA 4		Carrier Sy	Carrier Systems Development - 0603512N	opment - 06	503512N	Future Carrier R&D - 42208	- R&D - 42208					
	Contract	Performing	Total		FY 99		FY 00		FY 01			
or System/Item		Activity &		FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
	& Type	Location			Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Product Development										1		
Aircraft Launch, Recovery & Support CPAF		Northrop Gumman				14.000	11/99	17.365	N/A	Cont.	Cont.	Cont.
	Γ	General Atomics				14.000	11/99	17.365	N/A	Cont.	Cont.	Cont.
×		NAWC Lakehurst, NJ	2.711			2.236	11/99	2.483	11/00	Cont.	Cont.	S it
4	S	NNS, Va				0.450	11/99	5.000	11/00	Cont.	Cont.	Cont.
>	<u>ر</u>	Miscellaneous				0.600	11/99	0.618	11/00	Cont.	Cont.	Sont.
Battle Damage & Recovery	Г	NSWC/CD, MD	1.000			2.987	11/99	3.200	11/00	Cont.	Cont.	Conf.
	Γ	APG, MD				0.000	11/99	1.000	11/00	Cont.	Cont.	Cont.
A	S	NNS, Va				1.590	11/99	1.000	11/00	Cont.	Cont.	Cont.
0		Miscellaneous	1.511			0.000	11/99	2.100	11/00	Cont.	Cont.	Cont.
Propulsion Plant Development	SCPFP	BETTIS, PA	9.000	18.739	11/98	45.300	11/99	0.000	N/A	0.000	73.039	73.039
	U	NNS, Va						50.767	11/00	57.200	107.967	107.967
>	Various	Miscellaneous	2.299			0.000	N/A	0.000	N/A	Cont.	Cont.	Cont
Manpower & Material Support	Г	NSWC/CD, MD				0.284	11/99	1.200	11/00	Cont.	Cont.	Cont.
	Suc	Miscellaneous	2.298			0.300	11/99	0.000	N/A	Cont.	Cont.	Cont.
0	ŀ	Boeing, CA				0.800	11/99	0.800	11/00	Cont.	Cont.	Cont.
Systems Development	Various	Miscellaneous				4.346	11/89	3.709	11/00	Cont.	Cont.	Cont.
Combat & Intelligence Systems		NNS, Va				10.400	11/99	0.000	N/A	Cont.	Cont.	Cont.
		TBD				10.417	01/00	0.000	N/A	Cont	Cont.	Cont.
Smart Carrier V	Various	TBD						12.000	11/00	Cont.	Cont.	Cont.
Subtotal Product Development			18.819	18.739		107.710		118.607		Cont.	Cont.	Cont.
Remarks:												
Development Support Equipment											0000	
GFF											0000	
Subtotal Support			0.000	0.000		0000		0.000		0.000	0.000	
Remarks:												

R-1 SHOPPING LIST - Item No. 38-13 of 38-33

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 13 of 33)

UNCLASSIFIED

								DATE:				
Exhibit R-3 Cost Analysis (page 2)										February 2000	00	
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E, N / BA 4		Carrier Sy	Systems Development - 0603512N	lopment - 04	603512N	Future Carrier	Future Carrier R&D - 42208					
stem/Item	tract P	Contract Performing Method Activity &	Total PY s	FY 99	FY 99 Award	FY 00	FY 00 Award	FY 01	FY 01 Award	Cost to	Total	Target Value
Requirements) & Type		Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Developmental Test & Evaluation						307.0	74,00	0.746	44,000		100	100
Aircraft Launch, Recovery & Support CFAF	Τ	Miscellaneous				3.166	66/11	3.745	20/1.	Con	5	COLL
Operational Test & Evaluation	+											
Aircraft Launch, Recovery & Support												
Subtotal T&E	H		0.000	0.000		3.166		3.745		Cont.	Cont.	Cont.
Contractor Engineering Support												
Aircraft Launch, Recovery & Support	H											
Program Management Support CSS		TBD				0.164	11/99	0.169	11/00	Cont.	Cont.	Cont.
Travel												
Labor (Research Personnel)												
Overhead	_											
Subtotal Management	H		0.000	0000		0.164		0.169		Cont.	Cont.	Cont.
Remarks:												
Total Cost	H		18.819	18.739		111.040		122.521		Cont.	Cont.	Cont.
Remarks:												

R-1 SHOPPING LIST - Item No. 38-14 of 38-33

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 14 of 33)

UNCLASSIFIED

	EXHIBIT R-2a, RDT&E Project Justification	Project Just	tification				DATE:	Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E. N / BA 4	PROGRAM ELEMENT NAME AND NUMBER Carrier Systems Development - 0603512N	EMENT NAME	ELEMENT NAME AND NUMBER stems Development - 0603		PROJECT NAME AND NUMBER CVN Technology Insertion - 42678	ME AND NUMI	3ER 12678			
T (\$ in Millions)		FY 1999	FY 2000		FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		48.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	48.400
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification:
This one year project was established to fund the research, development, test, and evaluation, and for acquisition of technologies for use in the CVN77 aircraft carrier program. Specifically, the technologies funded are those which transition from the CVNX7 aircraft carrier program to the CVNX aircraft carrier program, and that mitigate the cost or technical risks of that program.

FY 1999 ACCOMPLISHMENTS:

- reductions. Established data transfer protocols for the exchange of design data between shipyards. Developed product data management software for propulsion plant design and analyzed data. Identified - (U) (\$14.517) Established contractor and management interface to the integrated product data environment to coordinate design development and manufacturing processes to achieve life cycle cost advanced analysis capabilities required for design development and began testing product modeling software.
- boundaries, and test and evaluation. Identified and commenced trade studies intended to reduce cost without degrading operational performance. Commenced Phase II; completing competitive solicitation and evaluation of solicitations to determine final two proposed integrators. Continued Combat Systems Integration concepts and design process. Identified updates to CVN77 Contract Design - (U) (\$18.099) Completed functional requirement documents for command and control, weapons and sensors, external communications, mission planning, computing architecture, ship interface ILS/Configuration Management Plan.
- (U) (\$15.784) Supported CVNX Engineering Team for design, engineering and interoperability analysis to support Milestone I. Also supported Requirements and AOA Teams for TOC reductions/analysis, survivability analysis and CVNX Advanced Launch & Recovery, and trade studies and Lethality Studies (ORD Specific). Provided acquisition planning support.

FY 2000 PLAN: Not applicable.

FY 2001 PLAN: Not applicable.

38-15 of 38-33 R-1 SHOPPING LIST - Item No.

(Exhibit R-2a, page 15 of 33) Exhibit R-2a, RDT&E Project Justification

UNCLASSIFIED

EXHII	BIT R-2a, RDT	EXHIBIT R-2a, RDT&E Project Justification	ification			DATE:	February 2000	, 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM	PROGRAM ELEMENT NAME AND NUMBER	: AND NUMBER	PROJE	PROJECT NAME AND NUMBER	MBER		
RDT&E, N / BA 4	Carrier S	ystems Develo	Carrier Systems Development - 0603512N		CVN Technology Insertion 42678	42678		
B. Other Program Funding Summary.								
EV 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To <u>Complete</u>	Total <u>Cost</u>
Related RDT&E:								
0604567N/42301 CV Contract Design 33.294	35.271	38.311	25.394	24.113	25.789	27.458	CONT	CONT
Related SCN:								
200100 Carrier Replacement Program 122.897	749.601	4,075.522	146.826	428.159	1,323.287	128.834	CONT	CONT
C. Acquisition Strategy: The Carrier acquisition strategy for CVN77 and follow hulls is to utilize a phased design and technology insertion or "evolutionary" strategy. This strategy will focus on combat system redesign (topside) on CVN77, new propulsion plant and Advanced Technology Launcher on CVNX-1, and hull, distributive systems and functional arrangements on the CVNX-2. On each hull, core capabilities will be maintained and Total Ownership Costs will be reduced in accordance with Carrier goals. As with past NIMITZ class carriers, the CVN77 will be awarded as a sole source FPIF contract to Newport News Shipbuilding. For CVNX-1 and future hulls, various contracting methods are being considered.	rategy for CVN77 n plant and Adval Costs will be redu hulls, various con	' and follow hulls i nced Technology I ced in accordance itracting methods a	is to utilize a phased Launcher on CVNX-1, with Carrier goals. A are being considered.	design and tec , and hull, distri \s with past NI\	chnology insertion coutive systems and	or "evolutionary" to functional arrange the CVN77 will be	strategy. This stra gements on the C\ e awarded as a sc	ategy will focus on combat VNX-2. On each hull, core ole source FPIF contract to
D. Schedule Profile:		FV 1999		à	FY 2000	ũ	FY 2001	
Program Milestones		CVNX: 4	CVNX: 4Q AoA PART III	-•	CVNX: 2Q MS1	[]		
Engineering Milestones					ATL: 2Q SRR ATL: 4Q PDR	ATL	ATL: 3Q CDR	
T&E Milestones					i			
Contract Milestones				AT	ATL: 1Q PDRR Phase			
			TO LONGGOOD LO	l	20 40 -5 00			

R-1 SHOPPING LIST - Item No. 38-16 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 16 of 33)

UNCLASSIFIED

PY 01 Award C Date C Date C C									DATE.				
PROJECT NAME AND NUMBER PROCRAM ELEMENT PROJECT NAME AND NUMBER Carrier Systems Development - 0603512N Contract Performing Prost	Exhibit R-3 Cost Analysis (pa	ge 1)							i :		February 2000	00	
Contract Performing Fry 99 Fry 90 Fry 00 Fry 01 Fry	APPROPRIATION/BUDGET ACTIV	/IT/	PRO	SRAM ELEMENT			PROJECT NA	AME AND NUN	MBER				
Contract Performing Pry 6 Pry 99 Pry 99 Pry 10 Pry 1	RDT&E, N / BA 4		Carr	ier Systems Dev	elopment - (0603512N	CVN Technol	ogy Insertion -	42678				
Method Admitty &	Cost Categories	Contract		Total		FY 99		FY 00	i	FY 01	:		
C AME Afrington, Va Cost	(Tailor to WBS, or System/Item		Activity &	PYs		Award	FY 00	Award	FY 01	Award	Cost to	Total	l arget Value
C AME Aflington, Va 2,000 0/199 C C JUMA, Aflington, Va 2,000 0/199 C C JUMA, Aflington Va 2,000 0/199 C C NINS, Va 18,500 0/199 C C C NISS CAPEP BETTIS, Lake Va 2,500 0/199 C C C C Contractor, Various 2,576 0/199 C C C C C C C C C C C C C C C C C C	Requirements)	- 1	Location	COST		Date	Cost	Date	Sost	Dale	Collibrate		מ כמווומכו
C JJMA, Arlington Va 2,000 01/99 C NNS, Va 4,200 01/99 WR NSWC CD Va 4,200 01/99 C C C C C C C C C C C C C C C C C C	Primary Hardware Development		AME Arlington, Va	Andrew Control of the	- 1	01/99						2:000	
C NNS, Va			JJMA, Arlington Va			01/99						2.000	
WRR NSWC CD Va 4,200 01/89 C WR NAWC Lake Va 2,500 01/89 C C C Contractor, Various 2,576 01/89 C Upport Equipment WR Navy Field, Various 2,107 01/89 C ct Development WR Navy Field, Various 2,107 01/89 C C incs Support 48,400 0,000 48,400 0,000 C C an agement MR MR <td></td> <td></td> <td>NNS, Va</td> <td></td> <td>18.500</td> <td>01/99</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>18.500</td> <td></td>			NNS, Va		18.500	01/99						18.500	
WR INAWC Lake Va SS,CPFP BETTIS, Pa 2,500 01/99 College			NSWC CD Va		4.200	01/99						4.200	
SS,CPFP BETTIS, Pa			NAWC Lake Va		2.500	01/99						2.500	
C Contractor, Various 2.576 01/99		띥	BETTIS, Pa		14.517	01/99						14.517	
upport Equipment WR Navy Field, Various 2.107 01/99 Common Process upport Equipment 48.400 48.400 0.000		ပ	Contractor, Various		2.576	01/99						2.576	
uct Development 0.000 48,400 0.000 upport Equipment 0.000 0.000 0.000 prinent 0.000 0.000 0.000		WR	Navy Field, Various		2.107	01/99						2.107	
upport Equipment polyment proment stics Support stanagement tanagement ont ont	Subtotal Product Development			0000	48.400		0.000		0.000		0.000	48.400	
upport Equipment 60000 0.000	Remarks:												
ities Support lanagement ont O,000 O,000 O,000 O,000 O,000 O,000	Development Support Equipment											0000	
Sitos Support lanagement anagement ort	Software Development											0.000	
anagement lanagement 0.000 0.0	Training Development											0.000	
ort 0.000 0.000 0.000 0.000	Integrated Logistics Support											0.000	
ort 0.000 0.000 0.000 0.000	Configuration Management											0.000	
0000 00000 00000	Technical Data											0.000	
0000 0000	GFE											0.000	
Remarks:	Subtotal Support			0.000	0.000		0:000		0.000		0:000	0.000	
	Remarks:												

R-1 SHOPPING LIST - Item No. 38 - 17 of 38-33

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 17 of 33)

UNCLASSIFIED

								DATE:				
Exhibit R-3 Cost Analysis (page 2)	5)									February 2000	00	
PPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	MBER				
NDT&E, N / BA 4		Carrier S	Carrier Systems Development - 0603512N	opment - 00	603512N	CVN Technol	CVN Technology Insertion - 42678	42678		-		
		6	Total	5	FY 99	8	FY 00	5	FY 01	of to	Total	Target Value
Tailor to WBS, or System/Item M.	Method Actr	Activity &	PY S	FY 89	Award	Cost	Date	Cost	Date	Complete	Cost	of Contract
Test & Evaluation	_										0.000	
Derational Test & Evaluation											0.000	
olina											0.000	
SFE											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0000	
Remarks:												
Contractor Engineering Support											0.000	
Sovernment Engineering Support											0.000	
Program Management Support											0.000	
ravel											0.000	
abor (Research Personnel)											0.000	
Verhead								000		0000	0.000	
Subtotal Management	-		0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
otal Cost			0.000	48.400		0.000		0.000		0000	48.400	
Remarks:												
			R-1 SHOF	R-1 SHOPPING LIST - Item No.	- Item No.	38-18 of 38-33	8-33		1			

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 18 of 33)

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E	&E Project Justification	tification				DATE:	Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM EL	ELEMENT NAME AND NUMBER	AND NUMBE	i;	PROJECT NAME AND NUMBER	ME AND NUM	3ER			
BDT&E. N/BA4	Carrier Sys	ystems Development - 0603512N	opment - 06		Carrier Systems Definition - 42693	s Definition - 4	2693			
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
								1	,	,
Project Cost		34.243	24.529	14.362	13.088	0.000	0.000	0.000	Cont.	Cont.
RDT&E Articles Otv										

A. (U) Mission Description and Budget Item Justification: This project performs the Ship Feasibility Studies required after Milestone 0 (MS 0) to address a specific Mission Needs Statement (MNS) and support the Analysis of Alternatives (AOA) for the Future Carrier (CVNX) Program; performs impact studies of aircraft/air wing composition, propulsion, hull alternatives, combat systems, machinery and electrical subsystems, and cost on CVNX designs, supports the development of the Operational Requirements Document (ORD) and other documentation required at Milestone I. Completion of this phase allows review and approval, at Milestone I, to transfer a ship program to the Contract Design Program Element 0604567N. Ship Feasibility Study products include a description of the alternative ships' principal characteristics and mission critical subsystems, weight estimates, general arrangement sketches, technical risk assessments, and Class F cost estimates. The objective is to provide the decisionmakers with feasible, affordable alternatives.

- (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 1999 ACCOMPLISHMENTS:

and survivability. Assessed preliminary sizing of emergency generator support systems and major propulsion plant component foundations. Evaluated shock and sizing analyses of heat exchanger designs. Reviewed possible instrumentation and control systems and equipment. Identified interface constraints and began refining layout concepts to ensure compatibility with the NIMITZ hull form. Identified and power ratings and voltages, identified performance requirements, and established conceptual designs. Developed electric and steam plant weight and volume estimates and determined impacts on stability assessed potential impacts of new propulsion plant systems on hull and waterlight bulkhead penetrations. Identified non-propulsion mechanical system concepts to be developed and integrated with the - (U) (\$29.372) Identified and evaluated propulsion plant functional and manning requirements, performed conceptual studies and analyzed component arrangements. Evaluated possible turbine generator propulsion plant.

- (U) (\$4.871) Supported CVNX Engineering Team for design, engineering and interoperability analysis to support Milestone I. Also supported Requirements and AOA Teams for TOC reductions/analysis, survivability analysis and CVNX Advanced Launch & Recovery, and trade studies and Lethality Studies (ORD Specific). Provided acquisition planning support.

R-1 SHOPPING LIST - Item No. 38-19 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 19 of 33)

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	DATE:	February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N / BA 4	Carrier Systems Development - 0603512N	Carrier Systems Definition 42693	

FY 2000 PLAN:

- (U) (\$13.122) Conduct ORD level requirements definition, industrial capability assessments, risk assessment and management, schedule development and tracking, and threat assessments necessary to insure a coordinated acquisition effort. Develop an Integrated Master Plan. Develop the Test and Evaluation Master Plan. Develop logistics requirements including integrated logistics assessments, maintenance planning, supportability analysis, logistics process improvements, computer resource requirements analysis, and manpower/workload assessments. Develop cost model and baseline cost
- (U) (\$11.407) Conduct engineering effort associated with the CVNX Ship Development phase to develop ship requirements and definition at the total system level. Conduct trade studies to support total ship definition including baseline design/build budget and baseline cost estimate. Further develop Integrated Product Process Development (IPPD).

FY 2001 PLAN:

- (U) (\$8.872) Continue to conduct ORD level requirements definition, industrial capability assessments, risk assessment and management, schedule development and tracking, and threat assessments necessary to insure a coordinated acquisition effort. Continue to develop an integrated Master Plan and the Test and Evaluation Master Plan. Continue development of logistics requirements including integrated logistics assessments, maintenance planning, supportability analysis, logistics process improvements, computer resource requirements analysis, and manpower/workload assessments. Continue to develop cost model and baseline cost estimate.
- (U) (\$5.490) Continue to conduct engineering effort associated with the CVNX Ship Development phase to develop ship requirements and definition at the total system level. Continue trade studies to support total ship definition including baseline design/build budget and baseline cost estimate. Further develop IPPD.

R-1 SHOPPING LIST - Item No. 38-20 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 20 of 33)

UNCLASSIFIED

EXHE	EXHIBIT R-2a, RDT&	RE Project Justification	ification			DATE:	February 2000	7 2000
APPROPRIATION/BUDGET ACTIVITY BDT&F N / BA 4	PROGRAM Carrier S	PROGRAM ELEMENT NAME AND NUMBER Carrier Systems Development - 0603	PROGRAM ELEMENT NAME AND NUMBER Carrier Systems Development - 0603512N		PROJECT NAME AND NUMBER Carrier Systems Definition - 42693	JMBER - 42693		
B. Other Program Funding Summary							To Total	
FY 1999 Related RDT&E:	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Complete	Cost
0604567N/42301 CV Contract Design 33.294	35.271	38.311	25.394	24.113	25.789	27.458	CONT	CONT
0603570N/S2692 Advance Nuclear Power System 0.000	68.687	99.212	104.800	142.352	132.321	119.880	688.000	1,355.252
Related SCN: 200100 Carrier Replacement Program 122.897	749.601	4,075.522	146.826	428.159	1,323.287	128.834	CONT	CONT
C. Acquisition Strategy: The Carrier acquisition strategy for CVN77 and follow hulls is to utilize a phased design and technology insertion or "evolutionary" strategy. This strategy will focus on combat system redesign (topside) on CVN77, new propulsion plant and Advanced Technology Launcher on CVNX-1, and hull, distributive systems and functional arrangements on the CVNX-2. On each hull, core system redesign (topside) on CVN77, new propulsion plant and Advanced Technology Launcher on CVNX-1, and hull, core systems and functional arrangements on the CVNX-2. On each hull, core capabilities will be maintained and Total Ownership Costs will be reduced in accordance with Carrier goals. As with past NIMITZ class carriers, the CVN77 will be awarded as a sole source FPIF contract to Newport News Shipbuilding. For CVNX-1 and future hulls, various contracting methods are being considered.	ategy for CVN7: plant and Adva costs will be redt hulls, various co	7 and follow hulls i inced Technology I iced in accordance itracting methods a	is to utilize a phased Launcher on CVNX-1. with Carrier goals. Fare being considered.	design and tec , and hull, distril \s with past NIN	hnology insertion outive systems and IITZ class carriers,	or "evolutionary 1 functional arra the CVN77 will	" strategy. This stra ingements on the CN I be awarded as a so	itegy will focus on combal VNX-2. On each hull, core ble source FPIF contract to
D. Schedule Profile:		FY 1999		Ä	FY 2000	 ,	FY 2001	
Program Milestones		CVNX: 4	CVNX: 4Q AoA PART III CVNX: 1Q AoA PART II completed		CVNX: 2Q MS1	!		
Engineering Milestones				ATL ATL	ATL: 2Q SRR ATL: 4Q PDR	Α	ATL: 3Q CDR	
T&E Milestones								
Contract Milestones				ATL	ATL: 1Q PDRR Phase			
			Ç.					
			HOI I CHILDON	ļ	20 24 of 29 33			

R-1 SHOPPING LIST - Item No. 38-21 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 21 of 33)

CLASSIFICATION:

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Chihit D 2 Cost Analysis (nage 1)	1 6							DATE:		February 2000	000	
APPROPRIATION/BUDGET ACTIVITY	/ITY	PROGRA	PROGRAM ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	1BER				
DOTE N BA 4		Carrier System	Systems Deve	Is Development - 0603512N		Carrier Syster	Carrier Systems Definition - 42693	42693				
ארם אין אין פער	-		Total		Γ		FY 00		FY 01			
Cost Categories	Contract	Performing Activity &	DY &	FY 99			Award	FY 01	Award	Cost to	Total	Target Value
(Tallor to Wes, or Systeminem	R. Tyne	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Nequirellients)	SO COE	Se CDEDRETTIS DA	9000	29.372	11/98	0.000	N/A	0.000	N/A	0.000	35.372	35.372
Product Development	5	AME VA	4.800	2,051	02/99	2.000	11/99	2.000	11/00	Cont.	Cont.	Cont.
	0000	CWIL, VA	2000	1 000	00/00	1 000	11/99	1.000	11/00	Cont.	Cont.	Cont.
	2 2	C, CPFF JJIMA, VA	3,000	202	2072	1.000	11/99					
	200	WE NEWCYDD VA	1,500			1.000	11/99					
	QW.	Miscellaneous	10.624	0.503	02/99	2.000	11/99	2.000	11/00	Cont.	Cont.	Cont.
	Varions	Miscellaneous		1.317	02/99	2.529	11/99	1.362	11/00	Cont.	Cont.	Cont.
	200	NNS				15.000	11/99	8.000	11/00	Cont.	Cont.	Cont.
S. Marie Development			31.124	34.243		24.529		14.362		Cont.	Cont.	Cont.
Remarks:												
											0.000	
Development Support Equipment											0000	
Software Development											0000	
Training Development											0000	
Integrated Logistics Support											0000	
Configuration Management											0.000	
Technical Data											0.000	
GFE			000	000		000		0000		0.000	0.000	
Subtotal Support			0.000	0.000		0000		2000				
Remarks:												
Notice to the second se												
			0.0	TOI I CHICAGO FO	· Marie Ma	20 00 00 00 00	2 22					
						C > C						

R-1 SHOPPING LIST - Item No. 38-22 of 38-33

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 22 of 33)

UNCLASSIFIED

								DATE.				
Evhihit R-3 Cost Analysis (page 2)								i i		February 2000	00	
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT	ENT			PROJECT N	PROJECT NAME AND NUMBER	/BER				
RDT&E, N / BA 4		Carrier Systems Development - 0603512N	ns Develo	pment - 00	603512N	Carrier Syste	Carrier Systems Definition - 42693	42693				
Cost Categories Contract	Performing	Total	_		FY 99		FY 00		FY 01			:
or System/Item		PY s		FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	larget Value
	Location	Cost			Date	Cost	Date		Date	Complete	COST	O COLICACI
Test & Evaluation											0.000	
Operational Test & Evaluation											0.000	
Tooling											0.000	
GEE											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		0000	0.000	
Remarks:												
Contractor Engineering Support	_										0.000	
Government Engineering Support											0.000	
Drogram Management Support											0.000	
Travel											0.000	
i ahor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0000	0.000	
Remarks:												
Total Cost			31.124	34.243		24.529		14.362		Cont.	Cont.	N/A
Remarks:												
		CC.	R-1 SHOP	PING LIST	R-1 SHOPPING LIST - Item No.	38-23 of 38-33	8-33		Exhibit	Exhibit R-3. Project Cost Analysis	est Analysis	

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 23 of 33)

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	ification				DATE:	Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM EL	ELEMENT NAME AND NUMBER	AND NUMBE	£.	PROJECT NAME AND NUMBER	AE AND NUM	BER			
RDT&E. N / BA 4	Carrier Sys	tems Develo	opment - 06	03512N	/stems Development - 0603512N CV Launch & Recovery Systems - W1723	ecovery Syste	ems - W1723			
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
		1 600	1,829	6.805	13.177	12.227	12.110	16.356	Cont.	Cont.
riged cost										
RDT&E Articles Qty				7						

A. Mission Description and Budget Item Justification: This project addresses the development of systems providing approach and landing guidance and control; recovery; service; support; and launch for aircraft operating on or from ships. Payoffs include increased safety, greater sortie generation rates, enhanced aircraft boarding rates, reduced manning, increased aircraft service life, and fleet modernization. Specific programs include: The Virtual Imaging System for Approach and Landing (VISUAL): VISUAL will provide ship's force, the Landing Signal Officer (LSO), and pilots with enhanced images of the aircraft and ship in low visibility and night conditions during launch and recovery operations. The Constant Run-Out/Retract Valve (CROV): The CROV development effort will replace the existing control and retract valves on the MK7 arresting gear in order to enhance performance and restore margins of safety. This program addresses the CV(N) OAG's Number 10 priority item (arresting gear improvements).

Advanced Arresting Gear Engine (AAGE): The AAGE replace the MK7 arresting gear engine - which has reached the limits of its operating capability. This program addresses the CV(N) OAG's Number 10 priority item (arresting gear improvements).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 1999 ACCOMPLISHMENTS:

(U) (\$1,600) Completed design and integration of the VISUAL technology demonstration system and evaluation of critical technologies. Prepared documentation for Milestone II review in spring 2000. Prepared Engineering Development Model (EDM) RFP and planned for 2000 source selection. Provided continued engineering and management support to the program in anticipation of transition from Program Definition and Risk Reduction (PD&RR) to the Engineering and Manufacturing Development (E&MD) phase.

R-1 SHOPPING LIST - Item No. 38-24 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 24 of 33)

UNCLASSIFIED

Θ	EXHIBIT R-2a, RDT&E Project Justification	DATE	: February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N	Carrier Systems Development - 0603512N	CV Launch & Recovery Systems - W1723	W1723
CV 2000 DI ANI:			

FY 2000 PLAN:

- (U) (\$1.529) Release VISUAL EDM phase solicitation. Review responses and select VISUAL EDM contractor. Achieve Milestone II decision to proceed to the E&MD phase. Provide engineering and management support to the program, particularly for the transition from the PD&RR phase to the E&MD phase of the program.
- (U) (\$.300) Develop CROV acquisition strategy, performance specification, milestone and contracting documentation, and source selection criteria. Develop performance requirements and statement of objectives.

FY 2001 PLAN:

- (U) (\$3.580) Release CROV RFP, conduct proposal review and select EDM contractor. Achieve Milestone I / II. Award contracts for design, analysis, computer simulation, and prototype manufacture of two (2) CROV and control systems test articles. Perform initial test planning and test facility modifications.
- (U) (\$3.225) Develop AAGE system specification solicitation documentation. Prepare program documentation and make all preparations for Milestone I. Provide engineering and management support to the program.

R-1 SHOPPING LIST - Item No. 38-25 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 25 of 33)

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EXH	HBIT R-2a, RD	EXHIBIT R-2a, RDT&E Project Justification	stification		DΑ	DATE: Fe	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM	M ELEMENT NAM	ELEMENT NAME AND NUMBER	PROJECT NAM	PROJECT NAME AND NUMBER	2		
RDT&E, N	Carrier	Systems Devel	Carrier Systems Development - 0603512N	CV Launch & F	CV Launch & Recovery Systems - W1723	- W1723		7
B. Other Program Funding Summary: N/A	FY 1999	FY 200 <u>0</u>	FY 2001 FY 2002	2 EY 2003	FY 2004	FY 2005	To Complete	
Related RDT&E								
P.E. 0602122N (Aircraft Technology) 30.251	20.545	21.057	21.675	22.031	22.067	21.835		
P.E. 0604512N (Shipboard Aviation Systems)	8.189	9.002	9.833 8.669	9 8.866	6.555	5 6.784		
C. Acquisition Strategy: VISUAL: The Navy is conducting system integration and risk reduction efforts at NAWCADLKE, and is preparing a performance specification and will competitively award a cost plus award fee contract to deliver EDMs, with fixed price production options.	on and risk reductics.	on efforts at NAWC	ADLKE, and is preparing	a performance spec	ification and will o	competitively award a	cost plus award fee contract	
CROV: The Navy is preparing a performance specification and will competitively award up to two cost plus award fee contracts to develop prototypes. The Navy will then conduct a down select for EDM and production systems.	ification and will o	ompetitively award	up to two cost plus award	fee contracts to de	relop prototypes.	The Navy will then α	onduct a down select for EDM and	
AAGE: The Navy will award a cost plus award fee contract to develop the AAGE prototype. EDM and production quantities will be awarded on a sole source basis to the PD&RR phase contractor.	contract to develo	p the AAGE prototy	ype. EDM and production	quantities will be av	varded on a sole	source basis to the PI	O&RR phase contractor.	
Schedule Profile: Program Milestones		FY 1999	<u>FY 2000</u> VISUAL: 2Q 00 MS II	0 0 00 MS 11	FY 2001 CROV: 2Q 01 MS /	II/II		·····
Engineering Milestones	VISUA	VISUAL: 4Q 99 PDR			CROV: 3Q 01 PDR AAGE: 3Q 01 System Spec	oDR System Spec		
T&E Milestones								
Contract Milestones	VISUAL:	L: 4Q 99 RFP	VISUAL: 2Q	VISUAL: 2Q 00 EDM Awd	CROV: 1Q 01 EDM Award AAGE: 3Q 01 RFP	EDM Award RFP		
		R-1 SHO	R-1 SHOPPING LIST - Item No.	38-26 of 38-33	33			Ī

R-1 SHOPPING LIST - Item No. 38-26 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 26 of 33)

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				Value	ract				T												Ī				
				Target Value	of Contract																				
				Total		Cont.	Cont.	4.900	4 500	670.1	Cont.		000	0.00	0.000	0.000	0.000	0.000	0000	0000	Çont.	200			
	February 2000					Cont.	Cont.				Cont.										0000	00000			
					- 1	11/00	12/00																		
11.00	DAIE:	BER	г			3.225	3.580				6,805										000	0.000			
		PROJECT NAME AND NUMBER	CV Launch & Recovery Systems - W1723	FY 00 Award		11/99				11/99															
		PROJECT NA	CV Launch &			0.300				1.529	1 829	2701										0.000			
			603512N	FY 99 Award	Date	10/98																			
			lopment - 0	FV 99	Cost	1.600					1 800	0000										0.000			
		LEMENT	Carrier Systems Development - 0603512N	Total DV s	Cost	19.532		4.900			04 400	24.432										0000			
		PROGRAM ELEMENT	Carrier Sy		Activity & Location	NAWCAD I KF	TBD	Kaman,EM		TBD															
	(T			Contract	Memod & Type	Т	T	CPFF	Γ	CPAF															
	Evhihit R.3 Cost Analysis (nade 1)	APPROPRIATION/BUDGET ACTIVITY	RDT&E. N		(Tailor to WBS, or System/litem	are Development		L		anufacturing (VISUAL)	Award Fees	Subtotal Product Development		1	Development Support Equipment	Software Development	Training Development	Integrated Logistics Support	Configuration Management	Technical Data	GFE	Subtotal Support	Domorke.	Kernarks.	

R-1 SHOPPING LIST - Item No. 38-27 of 38-33

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 27 of 33)

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									DATE:		0000	Ç	
Exhibit R-3 Cost Analysis (page 2)	7)										rebinal y 20	2	
APPROPRIATION/BUDGET ACTIVITY	\ \ \		PROGRAM ELEMENT	ELEMENT			PROJECT N	PROJECT NAME AND NUMBER	MBER				
RDT&E. N			Carrier Sy	Carrier Systems Development - 0603512N	lopment - 0	0603512N	CV Launch &	Recovery Sy.	CV Launch & Recovery Systems - W1723				
ies	Contract	Performing		Total		FY 99		FY 00		FY 01		· ·	:
or System/Item	Method	Activity &		PΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
		Location		Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	OI CONTRACT
Test & Evaluation												0.000	
Operational Test & Evaluation												0.000	
Tooling												0.000	
GFE												0.000	
Subtotal T&E				0.000	0.000		0.000		0.000		0.000	Cont.	
Remarks:													
												0.000	
Contractor Engineering Support												0.000	
Government Engineering Support												0000	
Program Management Support												0000	
Travel												0.000	
Labor (Research Personnel)					-							0.000	
Overhead				000	0000		0.000		0.000		0.000	Cont.	
Subtotal Management				0.000	0000								
Remarks:													
												100	
Total Cost				24.432	1.600		1.829		6.805		Cont.	11.291	Cont.
Remarks:													
				R-1 SHO	R-1 SHOPPING LIST - Item No.	F - Item No.	38-28 of 38-33	8-33					

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 28 of 33)

UNCLASSIFIED

EXHIBIT	R-2a, RDT&	EXHIBIT R-2a, RDT&E Project Justification	tification				DATE:	Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM E	ELEMENT NAME AND NUMBER	E AND NUMBE	H.	PROJECT NAME AND NUMBER	ME AND NUM	BER			
BUTER N/BA4	Carrier Sy	Carrier Systems Development - 0603512N EAF Matting W2269	opment - 06	303512N	EAF Matting M	12269				
(arcilliM ri 2) FOOO		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
				-				000	000	40 540
Project Cost		2.052	3.539	4.212	0.871	0.000	0.000	0.000	0,000	10.01
RD1 &E Articles Qry			7							
The lightweight airfield mat and expeditionary		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	the second	Program Defin	High and Dick	Dad Intion (DD	RR) phase of 1	the lightweight	t airfield mat and ex	peditionary

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project addresses the Program Definition and Risk Reduction (PDRR) phase of the lightweight a arresting gear to meet naval aviation unique Expeditionary Airfield (EAF) operational requirements, including transportability requirements on Maritime Prepositioning Ships (MPS)

(U) The currently deployed EAF mat (AM-2) was developed for heavy fighter (such as the F-4) operations and is cumbersome to deploy. Lightweight (1/2 the weight of AM-2), less voluminous (1/2 the volume of AM-2), and easier to install (five days vice fifteen days to install a complete airfield) mat material may be technically feasible and commercially available, but must be evaluated for use with current volume of AM-2), and easier to install (five days vice fifteen days to install a competitional and Vertical and Short Take-off and Landing (V/STOL) airfields ashore. Candidate mat materials under consideration type/model/series naval and Air Mobility Command (AMC) aircraft at conventional and Vertical and Short Take-off and Landing (V/STOL) airfields ashore. include reinforced synthetic composite materials and polyvinyl fiberglass. These mat materials will be configured and evaluated under Marine Corps operational scenarios.

(U) The expeditionary arresting gear program will provide the Marine Corps with the capability to conduct short span arrestments of designated Navy and Marine Corps tail hook equipped aircraft in the expeditionary environment. The current arresting gear (M-21) cannot be adapted to operate on short span (100 feet or less) surfaces and is incapable of arresting the current inventory under casualty (no flaps or half flap) conditions. The M-21 has inadequate reliability and several replacement components are no longer produced. The replacement gear, M-31, will provide air transportability, rapid setup, full inventory operational compatibility under all arrestment conditions, and adequate operational reliability. Two M-31 prototype systems will be built under this project.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 1999 ACCOMPLISHMENTS:

(U) (\$2.028) Evaluated alternative anchoring systems. Designed and initiated fabrication of prototyped M-31 arresting gear.

(U) (\$.024) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

R-1 SHOPPING LIST - Item No. 38-29 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 29 of 33)

UNCLASSIFIED

HXH	EXHIBIT R-2a RDT&F Project Justification			DATE:	
					February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER		PROJECT NAME AND NUMBER	IBER	
RDT&E, N / BA 4	Carrier Systems Development - 0603512N		EAF Matting W2269		
FY 2000 PLAN:					
(U) (\$3.539) Complete fabrication of two prototype l	(U) (\$3.539) Complete fabrication of two prototype M-31 systems and initiate performance testing with deadloads.	adloads.			
FY 2001 PLAN:					
(U) (\$4.212) Complete performance testing with dea	(U) (\$4.212) Complete performance testing with deadloads. Conduct mobility, environmental, and operability testing. Demonstrate compatibility and performance thresholds with aircraft.	bility testing. De	monstrate compatibility	nd performance thresh	holds with aircraft.
B. Other Program Funding Summary					
EAF OPN (PE 0206139M)					Ω
	FY 1999 FY 2000 FY 2001 0 0	FY 2002 5.435	FY 2003 6.443 6	FY 2004 FY 2005 6.532 6.731	Complete 0
Related RDT&E: N/A					
C. Acquisition Strategy: The advanced lightweight mat acquisition strate operational environment. Upon qualification of a viable material, limited will be procured from the commercial source in accordance with Marine	C. Acquisition Strategy: The advanced lightweight mat acquisition strategy envisions the solicitation of candidate material panels from commercial sources for evaluation in the laboratory and in the operation of a viable material, limited production quantities will be procured for full scale environmental, performance, and operational testing. Production quantities will be procured from the commercial source in accordance with Marine Corps priorities.	ndidate material ured for full scal	panels from commercial e environmental, perforn	sources for evaluation ance, and operational	in the laboratory and in the testing. Production quantities
The arresting gear acquisition strategy is predicated on the creation of be shared between the partners. The commercial partner will take the tasked with system production.	The arresting gear acquisition strategy is predicated on the creation of a fully integrated team consisting of Navy and contractor personnel. Initial technology development and system design effort be shared between the partners. The commercial partner will take the lead in the prototype manufacturing effort; the Navy partner will lead the test effort, and the commercial partner will ultimately be tasked with system production.	of Navy and cont ig effort; the Nav	tractor personnel. Initial y partner will lead the te:	echnology developmer t effort; and the commt	nt and system design effort will ercial partner will ultimately be

R-1 SHOPPING LIST - Item No. 38-30 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 30 of 33)

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	EXHIBIT R-2a, RDT&E Project Justification	LC		DATE:	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	NUMBER	PROJECT NAME AND NUMBER	NUMBER	February 2000
RDT&E, N/BA4	Carrier Systems Development - 0603512N	nt - 0603512N	EAF Matting W2269		
D. Schedule Profile	<u>EY 1999</u>	FY 2000		FY2001	
Program Milestones					
Engineering Milestones	A/G PDR 1Q 99 CDR 4Q 99	A/G 2 Proto 4Q 00			
T&E Milestones				A/G DT 1Q-3Q 01	
Contract Milestones					

R-1 SHOPPING LIST - Item No. 38-31 of 38-33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 31 of 33)

UNCLASSIFIED

Carrier Systems Development - 0603512N	512N EAF Matting W2269 99 FY 00 FY 00 and Cost Date Cost 06/98 2.826 06/98 10/98 0.713 10/99 2 3.539	FY 01 Award Cost Date 1.340 06/98 2.872 10/00 4.212	Cost to Complete 98 0.000 00 0.307 0 0.564	Total 7 Cost 9.121 8.827 8.827 18.512	Target Value of Contract 9.961 N/A N/A
Performing	FY 00 Aw Cost Dal 2.826 0.713	Aw Aw B72 Dat B72 212	Cost	9.121 8.827 0.564 18.512	of Contract 0.961 N/A N/A
Activity & PY s FY 99 AW Location Cost Cost Dat ESCO 4.209 0.746 NAWCAD LKE 3.629 1.306 ESCO 7.838 2.052	14 UU AW Cost Dal 98 2.826 98 0.713 3.539	340 Dat	OOO	9.121 8.827 0.564 18.512	Of Contract 9,961 N/A
ESCO 4.209 0.746 NAWCAD LKE 3.629 1.306 ESCO 7.838 2.052	98 2.826 98 0.713 3.539	872 872 212		9.121 8.827 0.564 18.512	N/A
ESCO 7.838 2.052	3.539			8.827 0.564 18.512	NA
F ESCO 7.838	3.539	4.212	0.564	18.512	NA
ESCO 7.838	3.539	4.212	0.871	0.564	NA
ESCO 7.838	3.539	4,212	0.564	18.512	NIA
ESCO 7.838	3.539	4.212	0.871	18.512	NA NA
	3,539	4.212	0.871	18.512	
-	3,539	4.212	0.871	18.512	
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R-1 SHOPPING LIST - Item No. 38-32 of 38-33

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 32 of 33)

UNCLASSIFIED

	6								DATE:		February 2000	00	
xhibit R-3 Cost Analysis (page 2))e 2)		TIATING IS AN COOL	CAACAIT			IPPO IECT NA	PRO IECT NAME AND NUMBER	MBER				
APPROPRIATION/BUDGE! ACTIVITY	<u>.</u>		PACCASAM E	PROGRAM ELEMENT	onment - 06	303512N	FAF Matting W2269	W2269					
KDI &E, N / BA 4			Calliel Sys	DASC CHIST		1000		20 7.1		EV 04			
Sost Categories Tailor to WBS, or System/Item	Contract Method	Contract Performing Method Activity &		Total PY s	FY 99	FY 99 Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	Location				Date		Date	Cost	Date	Complete	Cost	OI COLITACI
Developmental Test & Evaluation												0000	
Operational Test & Evaluation												0.000	
Tooling												0000	
JEE .												0.000	
Subtotal T&E				0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: N/A													
												0.000	
Contractor Engineering Support												0.000	
Government Engineering Support												0.000	
Program Management Support												0.000	
Travel												0000	
Labor (Research Personnel)												0000	
Overhead									8		0000	0000	
Subtotal Management				0000	0.000		0.000		0000				
Remarks: N/A													
							-		4 242		0.871	18 512	
Total Cost				7.838	2.052		3.539		4.2.12		100	21000	
Remarks: N/A													
				2	old most Total Olding College	old moti	20 22 06 23	23					

R-1 SHOPPING LIST - Item No. 38-33 of 38-33

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 33 of 33)

UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification	RDT&E Bu	dget Item Jı	stification				DATE:	Febru	February 2000	
A DEPOPERATION/BLIDGET ACTIVITY					R-1 ITEM NOMENCLATURE	IENCLATURE				
RESEARCH DEVELOPMENT TEST & EVALUATION.	N. NAVY/BA-4	A-4			Shipboard S	ystem Com	Shipboard System Component Development/0603513N	opment/060	3513N	
COST (\$ in Millions)		FY 1999	(7) FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	_	99.395	113.474	244.437	317.176	239.701	136.747	116.371	CONT.	CONT.
AGS-Advanced Gin System/32467		(1) 15.025	28.755	101.956	139.844	108.878	51.613	47.449	CONT.	CONT.
Indexes Wafare (USW)/32468		(2) 10.312	15.554	21.235	25.466	20.652	16.790	16.756	CONT.	CONT.
Chinhord Arvillan System Develonment/S0382		2.927	(3)	0.000	0.000	0.000	0.000	0.000	0.000	N/A
Consolidated HM&E/32469		(4) 24.344	24.686	22.109	26.847	26.069	26.444	26.822	CONT.	CONT.
HM&E Improvement/S1712		0.957	(2)	0.000	0.000	0.000	0.00	0.000	0.000	N/A
interacted Topoido Decim (ITD)/32470		13.022	(5) 13.756	15.080	18.742	14.760	15.040	15.387	CONT.	CONT.
Integrated 1 Opside Design (110) 25-10 Chistogram Cur Component Davelonment/S2608		0.968	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.968
Integrated Down Systems (IPS)/32471		(6) 31.840	25.723	84.057	106.277	69.342	26.860	9.957	CONT.	CONT.
Man Overboard Indicator/32729		0.000	3.000	0.000	0.000	0.000	0.000	0.000	0.000	3.000
Shin Survivahility & Personnel Protection/32730		0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
Advanced Water Jet Technology/S2751		0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
Outstand BDT&E Articles		0	0	0	0	*2/TBD	0	0		
Quality of ND I &E Atticles										

Note (1) (U) FY 1999 funds were budgeted and executed under PE 0603795N/Project K2323 as displayed in the FY99 President's Budget exhibits. Funds from PE 0603795N/Project K2323 transitioned into PE 0603513N/Project 32467 in FY 2000 and out.

Note (2) (U) FY 1999 funds were budgeted and executed under PE 0603553N/Project V1704 as displayed in the FY99 President's Budget

exhibits. Funds from PE 0603553N/Project V1704 (except Distant Thunder) transitioned into PE 0603513N/Project 32468 in FY 2000 and out.

Note (3) (U) FY 1999 funds were budgeted and executed under PE 0603513N/Project S0382 as displayed in the FY99 President's Budget exhibits.

Funds from PE 0603513N/Project S0382 transitioned into PE 0603513N/Project 32469 in FY 2000 and out.

\$1565, and PE 0603563N/Project S2196 (only Affordability Through Commonality) as displayed in the FY99 President's Budget exhibits. Funds from PE 0603513N/Project S0381, PE 0603514N/Project S0384, PE 0603514N/Project S1565, and PE 0603563N/Project S2196 (only Affordability Note (4) (U) FY 1999 funds were budgeted and executed under PE 0603513N/Project S0382, PE 0603514N/Project S0384, PE 0603514N/Project

Note (5) (U) FY 1999 funds were budgeted and executed under PE 0603513N/Project S1712 as displayed in the FY99 President's Budget exhibits. Through Commonality) transitioned into PE 0603513N/Project 32469 in FY 2000 and out.

Funds from PE 0603513N/Project S1712 transitioned into PE 0603513N/Project 32470 in FY 2000 and out.

Note (6) (U) FY 1999 funds were budgeted and executed under PE 0603573N/Project S1314 as displayed in the FY99 President's Budget exhibits.

Note (7) (U) \$2.421M of the FY01 amount is that portion of the extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

39-1 of 39-35 R-1 SHOPPING LIST - Item No.

(Exhibit R-2, page 1 of 35) Exhibit R-2, RDT&E Budget Item Justification

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EXHIBIT R-2, RDT&E Budget Item Justification	DATE: February 2000
APPROPRIATION/RUDGET ACTIVITY	R-1 ITEM NOMENCLATURE
DESERBEH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	Shipboard System Component Development/0603513N
	bottomore 10 GG an energy at the beautiful VT at 1 and 1

systems development. Specific DD 21 associated systems development efforts that have been realigned under this PE include: the Advanced Gun Systems (formerly the personnel protection and survivability equipment and technologies including personnel locators and NDI devices to facilitate improved casualty response. Advanced Water Jet Vertical Gun for Advanced Ships); Undersea Warfare; Integrated Topside Design; and Integrated Power Systems. In addition, a number of HM&E development tasks have been incorporated into a consolidated HM&E Project (32469) focused on DD 21. In FY 00, DD-21 was provided Congressional funding for Man Overboard Indicator, Ship Survivability & Personnel Protection, and Advanced Water Jet Technology. Man Overboard Indicator funds will be used to test and evaluate devices that improve the safety of flight and helicopter deck personnel. Ship Survivability & Personnel Protection funds will be used for the evaluation of commercial off-the-shelf, non-developmental items(COTS/NDI) for A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (PE) has been modified in FY 2000 and out to focus on DD 21 associated (AWJ) Technology funds will be used to validate the performance of AWJ-21 using hydronumeric modeling and simulation design tools and small scale physical model tests.

and sub-surface superiority, provide local air defense, and will incorporate signature reduction to operate in all threat environments. DD 21 will have seamless Joint (U) This PE now provides funds for the development of the DD 21 Class of U. S. Navy surface combatants and its components. The mission of the DD 21 class is to provide affordable credible independent forward presence/deterrence and operate as an integral part of Naval, Joint or Combined Maritime Forces. DD 21 will provide an advanced level of land attack in support of the ground campaign and contribute to Naval, Joint or Combined battlespace dominance in littoral operations. It will establish and maintain surface nteroperability to integrate all source information for battlespace awareness and weapons direction.

* (U) For explanation of Test Articles see Projects 32467.

B. (U) PROGRAM CHANGE SUMMARY:

114.643	+129.794	244.437
FY 2000 108.334	113.334 + 0.140	113.474
FY 1999 100.748	135.958 -36.563	99.395
FY 2000 President's Budget:	Appropriated Value: Adjustment to FY 1999/2000 Appropriated Value/	FY 2000 President's Budget: FY 2001 PRES Budget Submit:

R-1 SHOPPING LIST - Item No. 39-2 of 39-35

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 2 of 35)

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: February 2000
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4 Shipboar	R-1 ITEM NOMENCLATURE Shipboard System Component Development/0603513N

- (U) The FY 1999 net decrease of \$36.563M is due to decreases for comparability adjustment (-\$22.911M), Restructure/Comparability (-\$10.235M), Small Business Innovative Research (-\$1.060M), Revised Economic adjustment (-\$0.059M), Inflation Savings (-\$0.459M), Below Threshhold Reprogrammings (-\$0.047M), Congressional cut (-\$3.000M), and Actual Update (-\$1.994M) is offset by increases for Civilian Personnel underexecution (+\$0.002M), Congressional add (+\$1.000M), TOC Initiative (+\$2.200M).
 - (U) The FY 2000 net increase of \$.140M is due to Outsourcing restoration.
- (U) The FY2001 net increase of \$129.794 is due to miscellaneous increases (outsourcing restoration/NWCF rate adjustments) of (+\$1.331), development of the Advanced Gun (+\$73.100), development of DD 21 Integrated Power System (+\$59.000), and miscellaneous decreases (contract efficiencies/revised economic assumptions) of (-\$3.637).
- (U) Schedule: See individual projects
- (U) Technical Parameters: Technical parameters are contained in the DD 21 Operational Requirements Document (ORD) approved by JROC on 16 October 1997.

R-1 SHOPPING LIST - Item No. 39-3 of 39-35

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 3 of 35)

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EXHIBIT R-2a, RDT&E Project Justification	2a, RDT&E	Project Jus	tification				DATE:	Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY P	ROGRAM ELI	EMENT NAME	PROGRAM ELEMENT NAME AND NUMBER		PROJECT NAME AND NUMBER	ME AND NUME	3ER			
	Shipboard Sys	ys Compo	Component Dev/0603513N	- 1	AGS-Advanced Gun System/32467	d Gun Syster	n/32467			
(+ + + + + + + + + + + + + + + + + + +		EV 4000	בא מטטט	FV 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
COST (\$ IN MINORS)		(4)	2007							
		15.025	28.755	101.956	139.844	108.878	51.613	47.449	CONT.	CONT.
righed Cost								¢	Figo	H
RDT&E Articles Qty		0	0	0	0	2	0	0	CON .	

Note (1) (U) FY 1999 funds were budgeted and executed under PE 0603795N/Project K2323 as displayed in the FY99 President's Budget exhibits. Funds from PE 0603795N/Project K2323 transitioned into PE 0603513N/Project 32467 in FY 2000 and out.

at a minimum, meet the Land Attack and Surface Dominance Missions assigned to the gun system. The system will provide a high rate of fire (approximately 12 rounds per minute) with a magazine capacity sufficient in size for meeting USMC operational requirements. Land based testing of prototype hardware to verify system design will A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: These funds provide for the development of the Advanced Gun System (AGS) associated with the development of DD 21. The AGS will consist of a major caliber gun, an automated ammunition handling system and a family of munitions/propelling charges. The AGS will, commence in FY 2003.

1. (U) FY 1999 ACCOMPLISHMENTS

- (U) (\$0.770) Conducted congressionally directed independent analysis of AGS concepts and delivered report to Congress.
- (U) (\$ 12.000) Completed AGS Concept Development phase under an existing agreement with Industry as an integral part of the DD 21 contract. (U) (\$ 2.255) Defined AGS operational environment.

2. (U) FY 2000 PLAN

- (U) (\$14.500) Initiate AGS Sub-system design phase.
 (U) (\$4.055) Complete AGS munitions concepts; develop performance and interface specifications.
 (U) (\$1.600) Develop proof of concept test fixture.
 (U) (\$8.600) Develop Validation and Verification (V&V) tools for AGS.

39-4 of 39-35 R-1 SHOPPING LIST - Item No.

(Exhibit R-2a, page 4 of 35) Exhibit R-2a, RDT&E Project Justification

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	EXHIBIT R-2a, RDT&E Project Justification	DATE:	February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	Shipboard Sys Component Dev/0603513N	AGS-Advanced Gun System/3246/	

- 3. (U) FY 2001 PLAN
- (U) (\$61.238) Complete AGS Sub-system design phase.
- (U) (\$16.288) Initiate Engineering and Manufacturing Development (E&MD) for AGS munitions; Conduct Industry competition based on performance specifications.
 - (U) (\$5.141) Continue proof of concept test fixture development.
- (U) (\$19.289) Continue development of V & V tools for AGS and AGS munitions.
- B. (U) OTHER PROGRAM FUNDING SUMMARY:

					3	0	1000	T. C. T. C. T.	1000 TOTOL
1 - 11.54 (*)	EV 1999	FY 2000	FY 2001	FY 2001 FY 2002 FY	2003	⊼ ≻	C007 14	10 Complete 10 Complete	I Otal Cost
	000	2000	. , , ,				000		1
(-)	, , , ,	011101	1100	200 000	247 706	763 620	857 350		
CO 04 Total Object Original/Engineering/060/300N	120 /04	167.738	303.274	505.303	0000	20.00			
	-	2							

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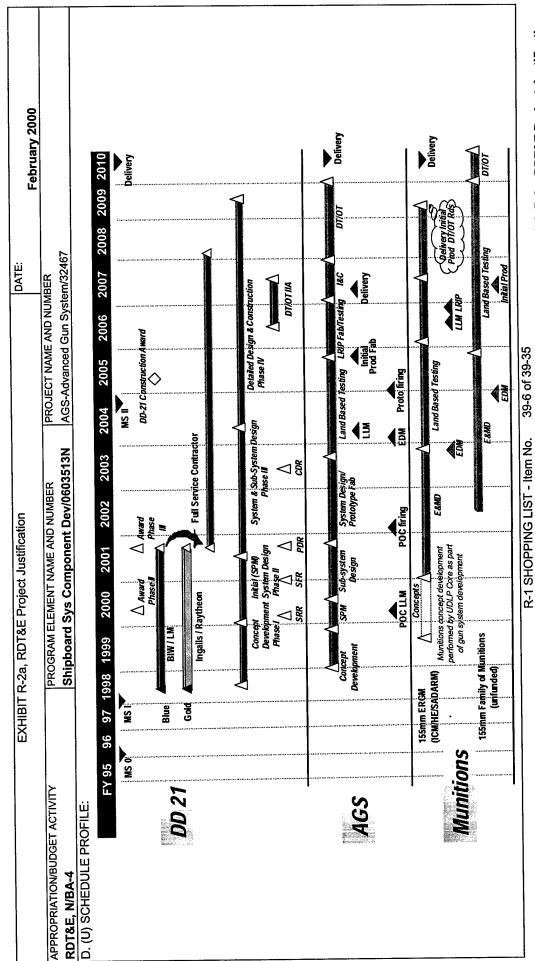
C. (U) ACQUISITION STRATEGY:

(U) The Navy will conduct a comparison of concepts for the DD 21 Advanced Gun System. The Advanced Gun System will be acquired in conjunction with the DD 21 development schedule. Initial phases will be conducted under section 845/804 other transaction authority. Initial phases include: Phase I – Concept Formulation, Phase II – Initial Prototype Development, Phase III – Subsystem Testing and Validation.

R-1 SHOPPING LIST - Item No. 39-5 of 39-35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 5 of 35)

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K-1 SHOPPING LIST - REITING. 33-0 OF 33

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 6 of 35)

UNCLASSIFIED

								DATE:				
Exhibit R-3 Cost Analysis (page 1)	te 1)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	TT/	PROGRAM	PROGRAM ELEMENT			PROJECT NAME AND NUMBER	ME AND NUN	1BER				
RDT&E. N/BA-4		Shipboal	Shipboard Sys Comp	np Dev/0603513N	13N	AGS-Advanced Gun System/32467	ed Gun Syste	em/32467				
Cost Catagories	Contract	Performing	Total		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item		Activity &		FY 99		FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type L	Location	-	Cost				Cost	Date	Complete		O COLITACE
Primary Hardware Development	Sec845/804E	D 21 Industry Teams	0.000	12.000	02/99	4.874	11/99	0.000	A/N	0.000	16.8/4	A/N
	Sec845/804 L	Sec845/804 DD 21 Industry Teams	0.000	0.000		20.693	01/00	97.675	11/00	CONT.	CON:	
Ancillary Hardware Development											0.000	
Systems Engineering											0.000	
licenses											0.000	
Tooling											0.000	
Surger Surger											0.000	
Award Food											0.000	
Subtotal Descript Description			0.000	12.000		25.567		97.675		CONT.	CONT.	
Remarks:												
Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Internated Logistics Support											0.000	
Configuration Management											0.000	
Tobailed Data											0.000	
GET.											0.000	
Subtotal Support			0.000	0.000		0:000		0.000		0.000	0.000	
Remarks:												
			R-1 SHOI	R-1 SHOPPING LIST - Item No.	- Item No.	39-7 of 39-35	35		Exhibit	Exhibit B.3 Project Cost Analysis	st Analysis	

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Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 7 of 35)

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Cobribit D 3 Cost Analysis (nage 2)	2)							DATE:		February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	95.2/ /ITY	PROGRAM ELEMENT	EMENT			PROJECT N	PROJECT NAME AND NUMBER	/BER				
POTRE N/BA-4		Shipboard Svs Comp Dev/0603513N	vs Comp D	ev/0603513	z	AGS-Advan	AGS-Advanced Gun System/32467	em/32467				
Cost Categories	Contract Performing	1	Total		FY 99		FY 00		FY 01	;	·	
(Tailor to WBS, or System/Item	Method Activity &			FY 99	Award	FY 00	Award	FY 01	Award	Cost to	l otal	l arget value
Requirements)	& Type Location		Cost	Cost	Date	Cost	Date	Cost	Date	Complete	0000	O COLINACE
Developmental Test & Evaluation										- LACO	000.0	
Operational Test & Evaluation										CONT.	0.000	
Tooling										CONT.	0.000	
GFE								0000			200.0	
Subtotal T&E			0.000	0.000		0000		0.000		0.000	0.000	
Contractor Engineering Support			0000	900	42,000	1 520	12/00	2 102	12/00	CONT.	CONT.	
Government Engineering Support		NSWC DD Dahlgen, VA	0.000	0.308	06/71	026.1	00/07	4 457	12/00	TNOO	TNOO	
		NSWC PHD Pt Hueneme, CA	000.0	0.475	12/98	1.100	66/71	10.1	2000	- FACO	TNOO.	
		NSWC IH Indian Head, MD	0.000	0.105	12/98	0.150	12/99	0.1/3	00/21	CONT.	1000	
	Γ	NSWC CD Bethesda, MD	0.000	0.100	12/98	0.000	12/99	0.075	12/00	CON.	CON .	
	WR SSCSD Sar	SSCSD San Diego, CA	0000	0.170	12/98	0.000	12/99	0.125	12/00	CONT.	CONI.	
			0000	1.267	03/99	0.418	Various	0.650	Various	CONT.	CONT.	
Program Management Support											0.000	
Travel											0000	
Labor (Research Personnel)											0000	
Overhead										FIACO	ENC.	
Subtotal Management			0.000	3.025		3.188		4.281		CON.	CON .	
Remarks:												
			000	45.025	-	28 755		101.956	-	CONT.	CONT.	
Total Cost			0.000	13,020		40.100						

R-1 SHOPPING LIST - Item No. 39-8 of 39-35

Remarks:

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 8 of 35)

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	EXHIBIT R-2a, RDT&E Proj	Project Jus	ject Justification				DATE:	Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEME	EMENT NAME	NT NAME AND NUMBER	ER	PROJECT NAME AND NUMBER	ME AND NUME	3ER			
RUTRE N/BA-4	Shipboard Sys	Sys Compo	Component Dev/0603513N		Undersea Warfare (USW)/32468	rfare (USW)/	32468			
SOST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
		(1)								
Droject Cost		10.312	15.554	21.235	25.466	20.652	16.790	16.756	CONT.	CONT.
1000 000										
DDT 8 E Adiolog Ob.		0	0	0	0	0	0	0	CONT.	CONT.
RUI & FAIICIES AIV										

exhibits. Funds from PE 0603553N/Project V1704 (except Distant Thunder) transitioned into PE 0603513N/Project 32468 in FY 2000 and out Note (1) (U) FY 1999 funds were budgeted and executed under PE 0603553N/Project V1704 as displayed in the FY99 President's Budget

Integrated Undersea Warfare (IUSW-21) concepts and technology. Key technology areas being investigated include: improvements in signal processing, advanced hull array and transducer technology to improve multi-static operation and in-stride mine avoidance. FY 2000 and subsequent efforts will focus on major technological and performance thrusts for DD 21 USW, which will define surface combatant USW capability for the Navy in the next century. These efforts will continue beyond DD 21 and provide improvements that apply across surface ship USW platforms. This project is funded as DEM/VAL because it develops and integrates hardware for experimental tests A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Undersea Warfare (USW) project provides advanced development demonstration and validation of technology for potential surface sonar and combat system application in conjunction with submarine efforts. Efforts focus on resolution of technical issues associated with providing capability against the year 2000 and beyond threat with emphasis on shallow water/littoral area USW and on Demonstration and Validation (DEM/VAL) of DD 21 information processing, and multi-sensor data fusion to improve target detection and classification performance and reduce system manning requirements; and towed array, related to specific ship or aircraft applications.

1. (U) FY 1999 ACCOMPLISHMENTS

- (U) (\$2.000) Began Concept Development for DD 21 Undersea Warfare, including risk mitigation plans and support for a Demonstration/Validation program to mitigate
- (U) (\$6.944) IUSW-21 BAA Risk Mitigation: Evaluated responses to a Broad Agency Announcement (BAA) and competitively awarded contracts and tasks to Industry, University and Government labs to mitigate risks associated with DD 21 USW system development. Risk mitigation addressed improvements in signal processing, advanced information processing, and multi-sensor data fusion to improve target detection and classification performance and reduced system manning requirements; and hull array and transducer technology to improve broad-band operation and in-stride mine avoidance.
 - (U) (\$1.368) IUSW-21 Systems Engineering: Completed IUSW-21 functional and operator task decomposition, identified technologies to be used to mitigate risks, established Dem/Val environment, oversaw risk mitigation effort, and conducted Dem/Val of products resulting from BAAs.

39-9 of 39-35 R-1 SHOPPING LIST - Item No.

(Exhibit R-2a, page 9 of 35) Exhibit R-2a, RDT&E Project Justification

UNCLASSIFIED

EXHIB	EXHIBIT R-2a, RDT&E Project Justification	DATE: February 2000	y 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	Shipboard Sys Component Dev/0603513N	Undersea Warfare (USW)/32468	

2. (U) FY 2000 PLAN

- (U) (\$5.000) DD 21 Industry Teams. Begin DD 21 USW initial system design. Participate in IUSW peer group and evaluate USW technologies.

- (U) (\$2.244) DD-21 Industry Teams. Continue to advance USW technology to meet DD 21 requirements by competitively awarding contracts to further define mine avoidance, torpedo defense, and reduced manning risk mitigation efforts.

- (U) (\$5.058) IUSW-21 BAA risk mitigation. Exercise FY00 option of BAAs awarded in FY99 to further define advanced information processing for automated detect classify and localize, data fusion, automated environmental adaptation, mine avoidance, and displays for reduced manning.

- (U) (\$3.252) IUSW-21 System Engineering. Perform Integrated Peer Group (IPG) engineering reviews of IUSW-21 advanced technologies. Perform IUSW-21 ADM system engineering in preparation for FY02 at sea demonstration. Develop interface specifications and sea test plan

3. (U) FY 2001 PLAN

- (U) (\$15.536) DD 21 Industry Teams. Continue DD 21 USW system design. Participate in IUSW peer group and evaluate USW technologies. Develop and integrate IUSW-

21 advanced technologies into ADM demonstration system.

- (U) (\$1.531) IUSW 21 Risk Mitigation. Exercise FY01 option of BAAs awarded in FY99 and other risk reduction efforts to further define advanced information processing for automated detect classify and localize, data fusion, automated environmental adaptation, mine avoidance, and displays for reduced manning.

- (U) (\$4.168) IUSW-21 System Engineering. Perform IPG engineering reviews of IUSW-21 advanced technologies. Perform IUSW-21 ADM system engineering in preparation for FY02 at sea demonstration. Finalize ADM sea test demonstration plan.

B. (U) OTHER PROGRAM FUNDING SUMMARY:

1000 TOO	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	l otal Cost
			1	ı			100		1
OO 04 Tatal Obia Contamo/Enginopring/060/4300N	120 704	161,118	305.274	303.989	617.796	763.620	857.350	CONI.	CONI.
SC-ZI Total Ship Systems/Englineering/coot-Soot		2							
									_

39-10 of 39-35 R-1 SHOPPING LIST - Item No.

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 10 of 35)

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E: February 2000		38
DATE:	PROJECT NAME AND NUMBER	Undersea Warfare (USW)/32468
EXHIBIT R-2a, RDT&E Project Justification	PROGRAM ELEMENT NAME AND NUMBER	Shipboard Sys Component Dev/0603513N
EXHIBIT	APPROPRIATION/BUDGET ACTIVITY	RDT&E, N/BA-4

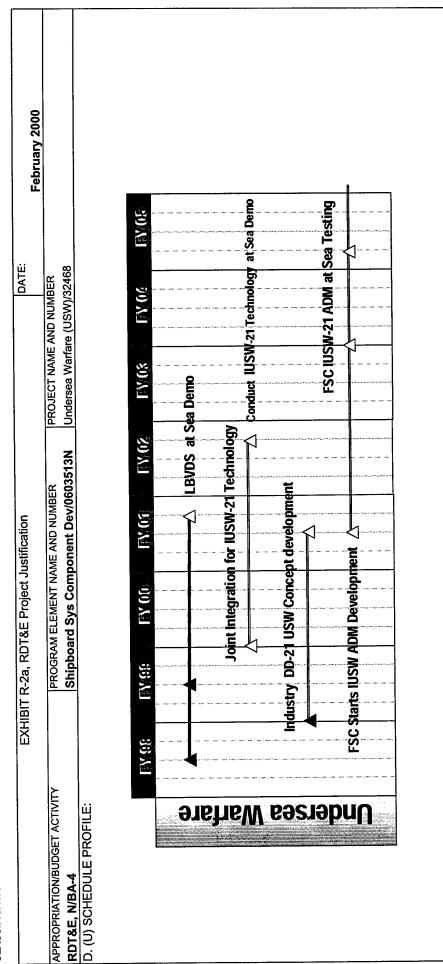
C. (U) ACQUISITION STRATEGY:

(U) In Contracting Phase I and II, DD 21 will use Section 845/804 agreement authority for the efforts conducted by the DD 21 Industry Teams. BAAs will be competitively awarded to further refine advanced information processing, broadband signal processing, hull array technology, and integrated stern mitigation and to provide further risk mitigation for DD 21 USW activities. In Contract Phases II and III responsibility for IUSW-21 ADM development will be with the DD 21 Industry Teams.

R-1 SHOPPING LIST - Item No. 39-11 of 39-35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 11 of 35)

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R-1 SHOPPING LIST - Item No. 39-12 of 39-35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 12 of 35)

UNCLASSIFIED

								DATE				
Exhibit R-3 Cost Analysis (page 1)	je 1)					!				February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	LΙΑ	PROGRA	PROGRAM ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER			:	
RDT&E, N/BA-4		Shipboa	Shipboard Sys Com	np Dev/0603513N	513N	Undersea W	Undersea Warfare (USW)/32468	/32468				
Cost Categories	Contract	Performing	Total		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Activity &	ΡΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Primary Hardware Development	Sec845/804	Sec845/804 DD 21 Industry Teams	0.000	2.000	11/98	7.244	11/99	15.536	01/01	CONT.	CONT.	
	BAA/CPFF	BAA/CPFF Competition	0.000	6.944	03/99	5.058	Various	1.531	Various	CONT.	CONT.	
Ancillary Hardware Development											0.000	
Systems Engineering											0.000	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal Product Development			0.000	8.944		12.302		17.067		CONT.	CONT.	
Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data	WR	NUWC/N Newport, RI	1.000	0.550	12/98	1.318	12/99	1.661	12/00	CONT.	CONT.	
	WR	NSWC DD Dahlgren, VA	0.200	0.075	12/98	0.300	12/99	0.400	12/00	CONT.	CONT.	
	SS/CPFF	APL/JHU Laurel, MD	0.400	0.162	12/98	0.400	12/99	0.500	12/00	CONT.	CONT.	
	SS/CPFF	APL/UW Seattie, WA	0.000	0.150	12/98	0.300	12/99	0.400	12/00	CONT.	CONT.	
	SS/CPFF	ARL/UT Austin., TX	000:0	0.150	12/98	0.300	12/99	0.400	12/00	CONT.	CONT.	
	SS/CPFF	ARL/PSU State Col, PA	000'0	0.150	12/98	0.300	12/99	0.400	12/00	CONT.	CONT.	
	C/CPFF	DSR Arlington, VA	0000	0.000	A/N	0.134	12/99	0.167	12/00	CONT.	CONT.	
GFE											0.000	
Subtotal Support			1.600	1.237		3.052		3.928		CONT.	CONT.	
Remarks:												

R-1 SHOPPING LIST - Item No. 39-13 of 39-35

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 13 of 35)

UNCLASSIFIED

								DATE:				
Exhibit R-3 Cost Analysis (page 2)	3ge 2)									February 2000	000	
APPROPRIATION/BUDGET ACTIVITY	MITY	PROGRAM ELEMENT	ELEMENT			PROJECT N	PROJECT NAME AND NUMBER	ABER				
RDT&E, N/BA-4		Shipboard	Shipboard Sys Comp [Dev/0603513N	ž	Undersea W	Undersea Warfare (USW)/32468)/32468				
Cost Categories	Contrac	5	Total	2	FY 99	8	FY 00	2	FY 01		- T-	H
(Tailor to WBS, or System/Item Requirements)	Methoc & Tvpe	Method Activity & & Type Location	Cost	Cost	Award	Cost	Award	Cost	Award	Cost to	Cost	of Contract
Developmental Test & Evaluation	Г										0.000	
Operational Test & Evaluation											0.000	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		0000	0.000	
Confractor Engineering Support	-										0000	
Government Engineering Support											0.000	
Program Management Support	GSA	Techmatics Arlington, VA	0.100	0.131	12/98	0.200	12/99	0.200	12/00	CONT.	CONT.	
Miscellaneous	PD/WR	_	0.000	0.000	Various	0.000	Various	0.040	Various	CONT.	CONT.	
Travel											0.000	
Labor (Research Personnel)	-										0.000	
Overhead											0.000	
Subtotal Management			0.100	0.131		0.200		0.240		CONT.	CONT.	
Remarks:		i										
											•	
Total Cost			1.700	10.312		15.554		21.235		CONT.	CONT.	
Remarks:												
			R-1 SHO	R-1 SHOPPING LIST - Ifem No	- Ifem No	39-14 of 39-35	1-35					
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R-1 SHOPPING LIST - Item No. 39-14 of 39-35

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 14 of 35)

UNCLASSIFIED

באו ויטון איז	EXHIBIT R-2a, RDT&E Project Justification	ject Justi	fication				DATE:	Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY PR	PROGRAM ELEMENT NAME AND NUMBER Shipboard Sys Component Dev/0603	NT NAME Compon	ENT NAME AND NUMBER Component Dev/0603513N	3513N	PROJECT NAME AND NUMBER Consolidated Hull, Mechanical	ME AND NUMI Hull, Mechan	3ER ical & Electric	al Improveme	PROJECT NAME AND NUMBER Consolidated Hull, Mechanical & Electrical Improvements (HM&E)/32469	
COST (\$ in Millions)	<u>. </u>	1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004		FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost	2	(1) 4.344	24.686	22.109	26.847	26.069	26.444	26.822	CONT.	CONT.
RDT&E Articles Qty		0	0	0	0	0	0	0	CONT.	CONT.

Project S1565, and PE 0603563N/Project S2196 (only Affordability Through Commonality) as displayed in the FY99 Presidents Budget exhibits. Funds from PE 0603513N/Project S0382, PE 060354N/Project S0384, PE 0603514N/Project S1565, and PE 0603563N/Project S2196 (only Note (1)) (U) FY 1999 funds were budgeted and executed under PE 0603513N/Project S0382, PE 0603514N/Project S0384, PE 0603514N/ Affordability Through Commonality) transitioned into PE 0603513N/Project 32469 in FY 2000 and out

- machinery, and Affordability Through Commonality (ATC) technologies and systems that will enable DD 21 survivability, manning, and life cycle cost goals to be met. The A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project supports the advanced development of DD-21 HM&E ship survivability, auxiliary products developed under this project also support the existing fleet and other ship acquisition programs. Note that the efforts under this project were previously supported by four separate projects (See Note 1) and were consolidated to facilitate an integrated system development approach that ensures all design considerations are addressed. The following provides a mission description for each development area (i.e., Survivability, Auxiliary, and Affordability):
- (U) Survivability: The survivability area supports development of systems and protection concepts that reduce vulnerability to conventional weapons and peacetime accidents and enables, under reduced manning conditions, a rapid recovery of mission capability. Development categories include damage control computer-based systems that provide for rapid systems restoration, fire protection devices that improve probability of survival with a reduced crew ship, and ship protection concepts that reduce magazine and commercial equipment vulnerability.
- manning through automation of operational, maintenance, and day-to-day functions traditionally performed by the crew, and supports development of auxiliary systems to (U) Auxiliary: For existing and future ships, this funding: 1) improves reliability/maintainability of fluid, electrical, and mechanical systems and 2) supports reduced reduce ship magnetic signature and vulnerability to mines.

R-1 SHOPPING LIST - Item No. 39-15 of 39-35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 15 of 35)

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	DATE:	
		Febr	February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	Shipboard Sys Component Dev/0603513N	Consolidated Hull, Mechanical & Electrical Improvements (HM&E)/32469	ments (HM&E)/32469

methods and modeling; use of ownership cost reduction best practices from industry and other services; cost effective equipment selection, maintenance; and logistics (U) Affordability Through Commonality: The Affordability Through Commonality program develops, demonstrates, and validates architectures, technologies, and concepts that reduce total ownership cost of existing and future ships, especially future surface combatants. Focus areas are total ship open system architectures; total ownership cost support, and innovative, enabling technologies for total ownership cost reduction.

1. (U) FY 1999 ACCOMPLISHMENTS:

(U) SURVIVABILITY:

applicable demonstration employing mount, raft and machinery. Conducted full scale demonstration tests of the effectiveness of anti-fratricide shielding in preventing sympathetic detonation. Conducted DD 21 applicable ship/ launcher magazine protection integration studies. Initiated planning for all-up full scale Integrated Magazine Protection System (IMPS) proof-of-concept demonstration employing multiple missiles, launcher, anti-fratricide shielding and water suppression. Completed Real Time Stability Status (RTSS) Fleet evaluation aboard the USS Rushmore. Completed shipboard demonstration of Damage Control System (DCS) firemain reconfiguration preliminary shipboard procedures for firefighting in a chemical, biological, and radiological (CBR) environment. Conducted full scale weapon effects demonstrations of automated fire suppression system. Developed DD 21 automated chilled water system isolation and reconfiguration system options. Continued development of the Advanced firefighting devices/systems that provide for remote control of a firehose nozzle enabling sustained operations in a reduced manning environment. Conducted survey of and raft. Conducted DD 21 ship/ system integration design assessments and finalized machinery mount/ design requirements. Initiated ASSIST planning for DD 21 management module. Completed fleet evaluations aboard the ex-USS SHADWELL to demonstrate the effectiveness of alternative reduced manning concepts. Developed Survivability Assessment Program (ASAP) fire and smoke model and initiated development of a crew casualty/damage control model. Initiated development of DD 21 (U) (\$7.407) Conducted full scale underwater explosion shock proof-of-concept demonstration test of Advanced Ship Shock Isolation Systems (ASSIST) machinery mount commercial robotic firefighting devices, developed operational requirements and initiated prototype system design.

R-1 SHOPPING LIST - Item No. 39-16 of 39-35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 16 of 35)

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EXF	EXHIBIT R-2a, RDT&E Project Justification	DATE:	Γ
		February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	Shipboard Sys Component Dev/0603513N	Consolidated Hull, Mechanical & Electrical Improvements (HM&E)/32469	

(U) AUXILIARY SYSTEMS:

water and other auxiliary systems with CLIDC systems. Completed evaluation of Polymer Current Limiters (PCL), Ground Fault Limiters (GFL). Continued development of Completed design, fabrication and LABEVAL of 100 ampere, single phase PCL for fuse replacement. Initiated PCL design for 3 phase fuse replacement. Completed concurrent engineering and cost analysis for AMF PM. Initiated development of a magnetic, onboard, self-monitoring, control system (CLDG) for steel hulled surface combatants including onboard sensor suites and control algorithms. Specified and initiated procurement of CLDG components. Completed development of the Underwater (U) (\$9.323) Continued development of advanced HM&E machinery and systems architectures to reduce manning and eliminate at-sea maintenance. Initiated low pressure air system full scale demonstration with Component Level Intelligent Distributed Control (CLIDC) system. Initiated Iaboratory demonstration of automated chilled Closed Circuit Blasting System. Continued development of the Remotely Operated Vehicle (ROV) Power System. Completed development of the Transient Analysis Model Power Electronic Building Block (PEBB) based Auxiliary Multi-Functional Power Module (AMF PM). Completed GFL algorithm development, SHIPEVAL and implementation. for the Program of Ship Salvage Engineering (POSSE). Continued development of fuel cells for ship service power applications. Continued MCFC 2500 KW conceptual design and trade off analysis.

(U) AFFORDABILITY THROUGH COMMONALITY:

- (U) (\$7.614) Affordability Through Commonality: Developed, demonstrated, and validated architectures, technologies, and concepts that reduce total ownership costs for backfit to existing ships was pursued. Focus of these efforts was on applications for on-going ship programs (DDG 51, DD21, CVN77, CVN(X)) and other ships in the SCN the future fleet. Identified areas/methods for common, fleet-wide means to improve life cycle affordability of future naval ships and shipboard systems. Where feasible,

2. (U) FY 2000 PLAN:

(U) SURVIVABILITY/AUXILIARY SYSTEMS

- (U) (\$4.280) Complete evaluation/upgrade of AMF PM brassboard and established requirements for prototype. Continue development of IMPS technologies. Complete laboratory demonstration of automated chilled water and other auxiliary systems with component level control; validate design tools. Continue development of the timedependent, computer-based ASAP for use in evaluating ship designs. Complete development of the ASAP fire and smoke model and continue development of the crew casualty/damage control model. Continue full scale testing aboard the DDG 76 of the advanced closed loop degaussing system. Complete development of the ROV power system. Develop conceptual/preliminary designs of 2.5 megawatt (MW) Ship Service Fuel Cell Power Module and initiate detailed design of 0.5 MW reduced scale demonstrator. Initiate development of the Improved Shaft Coating System. Initiate development of the Smart Tow Monitoring System. Initiate close out of composite pump
- (U) (\$12.366) Begin initial system design and engineering of DD 21 survivability/auxiliary systems.
- (U) (\$1.500) Initiate development of composite components and improved ventilation methods/materials that reduce sailor workload.

R-1 SHOPPING LIST - Item No. 39-17 of 39-35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 17 of 35)

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ш	EXHIBIT R-2a, RDT&E Project Justification	DATE:
		February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	Shipboard Sys Component Dev/0603513N	Consolidated Hull, Mechanical & Electrical Improvements (HM&E)/32469

(U) AFFORDABILITY THROUGH COMMONALITY:

- (U) (\$2.334) Across Program Total Ship Open Systems Architecture: Continue Navy-Industry effort to develop, demonstrate, validate and implement fleet- wide open systems architectures (OSA) and non- proprietary standard interfaces. The OSA will employ commercial processes and commercial off the shelf material and equipment to the greatest extent practicable. Continue to refine the Total Ship Open Systems Architecture Framework, including improved guidance on the architecture definition, definition of standard interfaces, and market surveillance and technology projection processes. Continue to define risk mitigation and demonstration and validation projects for the
- (U) (\$3.706) Continue Total Ship Open System Architecture Demonstration and Validation.
- (U) (\$0.500) Initiate development of improved commercial-based distribution systems for reduced sailor workload.

3. (U) FY 2001 PLAN

(U) SURVIVABILITY/AUXILIARY SYSTEMS

- Continue development of the ASAP crew casualty/damage control model. Continue full scale testing aboard the DDG 76 of the advanced closed loop degaussing system; update prediction algorithim. Continue development of advanced auxilary systems, components, and control systems. Complete design of 0.5 MW reduced scale demonstrator and initiate fabrication. Continue development of the Improved Shaft Coating System and the Smart Tow Monitoring System. Initiate planning for a full scale weapons effects demonstration of an automated fire fighting system for bulkhead boundary cooling and compartment sprinkling. Complete close out of composite pump - (U) (\$3.041) Complete development of IMPS technologies. Continue development of the time-dependent, computer-based ASAP for use in evaluating ship designs.
 - (U) (\$9.107) Complete initial system design and engineering of DD 21 survivability/auxiliary systems. Begin system/subsystem development of survivability/auxiliary
- (U) (\$1.500) Continue development of composite components and improved ventilation methods/materials that reduce sailor workload.

(U) AFFORDABILITY THROUGH COMMONALITY:

- (U) (\$2.029) Across Program Total Ship Open Systems Architecture: Continue Navy-Industry effort to develop, demonstrate, validate and implement fleet- wide open systems architectures (OSA) and non- proprietary standard interfaces. The OSA will employ commercial processes and commercial off the shelf material and equipment to the greatest extent practicable. Continue to refine the Total Ship Open Systems Architecture Framework. Investigate alternative total ship architecture concepts reflecting state-of-the-art concepts and practices for commercial industry and other services. Update the TOSA framework and guidance documents to reflect these evolving architectural concepts. Continue to define risk mitigation and demonstration and validation projects for the TOSA concept.
 - (U) (\$5.932) Total Ship Open System Architecture Demonstration and Validation
- (U) (\$0.500) Continue development of improved commercial-based distribution systems for reduced sailor workload

R-1 SHOPPING LIST - Item No. 39-18 of 39-35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 18 of 35)

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	stification				DATE:			
							Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAM	NT NAME AND NUMBER		PROJECT NAME AND NUMBER	1E AND NUME	ER.			
RDT&E, N/BA-4	Shipboard Sys Comp	Component Dev/0603513N		Consolidated	Hull, Mechani	cal & Electric	al Improvemer	Consolidated Hull, Mechanical & Electrical Improvements (HM&E)/32469	•
B. (U) OTHER PROGRAM FUNDING SUMMARY:	RY:								
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2000 FY 2001 FY 2002 FY 2003 FY 2004 FY 2005 To Complete Total Cost	Total Cost
SC-21 Total Ship Systems/Engineering/0604300N	1	20.704 161.118 305.274	305.274	303.989	617.796	303.989 617.796 763.620	857.350	CONT.	CONT.
C A D ACCUISITION STRATEGY:									

C. (U) ACQUISITION STRATEGY:

(U) These development efforts were realigned into this project in an effort to consolidate related DD 21 RDT&E efforts and will be transitioned into the DD 21 acquisition strategy in FY 2000 and out.

R-1 SHOPPING LIST - Item No. 39-19 of 39-35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 19 of 35)

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	EXHIBIT R-2a, RDT&E Project Justification	DATE	
			February 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4	PROGRAM ELEMENT NAME AND NUMBER Shipboard Sys Component Dev/0603513N		PROJECT NAME AND NUMBER Consolidated Hull, Mechanical & Electrical Improvements (HM&E)/32469
D. (U) SCHEDULE PROFILE:			
PROGRAM MILESTONES	FY 1999	FY 2000	FY 2001
Survivability/Auxiliary Systems Deliverables	4Q DD 21 ASSIST Machinery Integration Study 4Q DD 21 IMPS Ship Integration Study 4Q ASSIST UNDEX Machinery Mount Shock Tests AQ IMPS Demonstration 4Q DCS Structural Training Software 4Q DCS Structural Training Software 3Q Requirements Requirements 4Q Reduced Manning Option Evaluations 4Q Automated Fire Supression Demonstration 3Q Complete GFL SHIPEVAL 4Q GFL Specification 3Q Complete GFL SHIPEVAL 4Q UW Closed Circuit Blast System 4Q UW Closed Circuit Blast System 4Q Transient Analysis Model 4Q PEM FC Concept Design 4Q MCFC Preliminary Design 1Q Advanced Deg ATD transitions to Surfaces Combatants 4Q CLIDG System for Surface Combatants 4Q Demo Functional Control System Design 4Q Demo Functional Control System Design 4Q Demo Functional Control System Design	1Q Initial System Design 4Q ASAP Fire and Smoke Model 4Q ROV Power System 4Q 2.5 MW Ship Service Fuel Cell Power Module 2Q Initiate Smart Tow Monitoring System 3Q CLDG Ranging of DDG 76 4Q Validate Chilled Water Simulation & Design Tools 2Q Initiate Improved Shaft Coating System 4Q ROV Power System 2Q Prototype AMF PM Fabrication 2Q Prototype AMF PM Fabrication	1Q System/Subsystem Development 4Q ASAP Crew Casualty/IDC Model

R-1 SHOPPING LIST - Item No. 39-20 of 39-35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 20 of 35)

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	EXHIRIT R-2a RDT&F Project Instiffication	DATE	
		<u>.</u>	February 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4	PROGRAM ELEMENT NAME AND NUMBER Shipboard Sys Component Dev/0603513N	PROJECT NAME AND NUMBER Consolidated Hull, Mechanical & Electrical Improvements (HM&E)/32469	rical Improvements (HM&E)/32469
PROGRAM MILESTONES	FY 1999	FY 2000	FY 2001
Affordability Through Commonality (ATC)	AQ PODAC Cost Model Cost Estimating Relationships for Surface Combatants AQ DD21 Alliance Teams Flexibility, Upgradeability, Supportability, Adapdability Concept Design efforts & technology transfer AQ Advanced food service Technology demonstration AQ Advanced pesonnel transfer Architecture implementation AQ Advanced pesonnel transfer Architecture fimplementation AQ SEALINK/SAVERPRO implementation AQ Open Systems Architecture interface developmen for open HVAC and open chilled water AQ Containerized mission element module (CMEMS) concept development AQ Open Structure Shock & Cost Analysis	4Q Open Systems Architecture Guidance development development development development development development supportability, Adaptability, Preliminary design efforts & technology transfer deforts & technology transfer deforts & technology transfer deforts & technology transfer deforts & technology backlitectures deforts & technology backlitectures deforts & technology Development deforts & te	4Q. Open System Architecture interface development for sensor Technologies 4Q. DD21 alliance teams technology transfer and Assessments 4Q. OSA guidance 4Q. OSA business and development 4Q. Open C4ISR demonstration 4Q. Multi-function transfer system Architecture development 4Q. Open distributed data interface implementation
	TO TOTAL CHARGOLOGY	10 003, 10 00 -14	

R-1 SHOPPING LIST - Item No. 39-21 of 39-35

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 21 of 35)

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CLASSIFICATION:

								DATE:				
Exhibit R-3 Cost Analysis (page 1)	e 1)									February 2000	0	
APPROPRIATION/BUDGET ACTIVITY	١	PROGRAM	PROGRAM ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E, N/BA-4		Shipboar	Shipboard Sys Comp Dev/0603513N	p Dev/06035	13N	Consolidated	Hull, Mecha	nical & Electr	cal Improven	Consolidated Hull, Mechanical & Electrical Improvement (HM&E)/32469	39	
Cost Categories	Contract	Performing	Total		FY 99		FY 00		FY 01			
or System/Item	Method	Activity &	PΥs	FY 99	Award	_	Award		Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
٨												
Primary Hardware Development												
Product Development	Sec845/804	Sec845/804 DD 21 Industry Teams	0.000	2.020	11/98	12.366	11/99	9.107	10/00	CONT.	CONT.	N/A
	WR	NSWC CD Bethesda, MD	3.332	3.516	Various	2.500	Various	2.500	Various	CONT.	CONT.	
	Various	Other Govt Activities	3.018	1.336	Various	1.463	Various	0.805	Various	CONT.	CONT.	
	Varions	Other Contractors	2.100	0.535	Varions	1.817	Various	1.236	Various	CONT.	CONT.	
Ancillary Hardware Development											0.000	
Systems Engineering							1				0.000	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal Product Development			8.450	7.407		18.146		13.648		CONT.	CONT.	

Remarks: Auxiliary Systems will be consolidated with Survivability in FY 2000 and out

AFFORDABILITY THROUGH COMMONALITY	NALITY											
Engineering Dev, Demo & Eval	Sec845/804	Sec845/804 DD-21 Industry Teams	0.000	2.500	11/98	4.611	11/99	5.883	10/00	CONT.	CONT.	
	WR	NSWC CD Bethesda, MD	2.795	2.141	Various	0.739	10/99	1.101	10/00	CONT.	CONT.	
	22	NSWC CD Bethesda, MD	1.145	0.889	Various	0.000	N/A	0.000	N/A	CONT.	CONT.	
	Varions	Other Govt Activities	1.129	0.984	Various	0.200	10/99	0.349	10/00	CONT.	CONT.	
	Various	Other Contractors	1.941	1.100	Various	0.990	Various	1.128	Various	CONT.	CONT.	
Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			7.010	7.614		6.540		8.461		CONT.	CONT.	
Remarks:			-									

R-1 SHOPPING LIST - Item No. 39-22 of 39-35

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 22 of 35)

UNCLASSIFIED

								DATE:				
Exhibit R-3 Cost Analysis (page 2)	ge 2)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	/ITY	PROGRAM ELEMENT	EMENT			PROJECT NAME AND NUMBER	ME AND NUM	IBER				
RDT&E, N/BA-4		Shipboard \$	Shipboard Sys Comp Dev/0603513N	ev/0603513	z	Consolidated	Hull, Mechai	nical & Electri	cal Improvem	Consolidated Hull, Mechanical & Electrical Improvement (HM&E)/32469	69	
Cost Categories	Contract	Performina	Total		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Activity &								Cost to	Total	Target Value
Requirements)	& Type	Location		Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Developmental Test & Evaluation											0.000	
Operational Test & Evaluation											0.000	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
AUXILLARY SYSTEMS												
Contractor Engineering Support											0.000	
Product Development	SEC 845/804	DD 21 Industry Teams	00:00	4.950	11/98	0.000	N/A	0.000	N/A	CONT.	CONT.	
	WR	NSWC CD Bethesda, MD	5.481	4.253	11/98	0.000	N/A	0.000	N/A	CONT.	CONT.	
	Various	Other Govt Activities	0.751	090'0	Various	0.000	N/A	0.000	N/A	CONT.	CONT.	
	Various	Other Contractors	0.564	090'0	01/99	0.000	N/A	0.000	N/A	CONT.	CONT.	
Program Management Support											0.000	
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			6.796	9.323		0.000		0.000		CONT.	CONT.	
Remarks: Auxiliary Systems will be consolidated with Survivability in FY 2000 and out.	be consolidated	with Survivability in FY 2000 s	and out.									desce
										11.23	11.11	
Total Cost			22.256	24.344		24.686		22.109		CONT.	CONT.	
Remarks:												

R-1 SHOPPING LIST - Item No. 39-23 of 39-35

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 23 of 35)

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EX	EXHIBIT R-2a, RDT&E Project Justification	Project Just	tification				DATE:	Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4	PROGRAM ELEMENT NAME AND NUMBER Shipboard Sys Component Dev/0603	EMENT NAME Sys Compor	ENT NAME AND NUMBER Component Dev/0603513N	R 03513N	PROJECT NAME AND NUMBER Integrated Topside Design (ITD)/32470	PROJECT NAME AND NUMBER Integrated Topside Design (ITC)	3ER (ITD)/32470			
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		(1) 13.022	13.756	15.080	18.742	14.760	15.040	15.387	CONT.	CONT.
RDT&E Articles Qty		0	0	0	0	0	0	0	CONT.	CONT.

Note (1) (U) FY 1999 funds were budgeted and executed under PE 0603513N/Project S1712 as displayed in the FY99 President's Budget exhibits. Funds from PE 0603513N/Project S1712 transitioned into PE 0603513N/Project 32470 in FY 2000 and out. A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops and integrates the necessary technologies to achieve a total integrated topside design focused on DD 21 and future surface combatant ships. Technology areas including topside signature control, sensor and antenna integration, weapon system maintenance, and reduced manning attributes. This project also develops improved equipments that are small but critical components of non-propulsion HM&E systems. This layer of defense to support hardkill and softkill systems in defeating future threats. Composite materials will also be considered for their corrosion control, reduced program is directed toward improved affordability, performance, reduced life cycle cost, reliability and maintainability, signature reduction, standardization, and weight and integration, HM&E integration, related decision-making tools, and composite materials will be addressed. Other stand alone technology programs will be synergistically integrated with this topside design integration effort to assure total ship systems integration for future ship design efforts. Surface combatants will need an added (stealth) manning reductions for the existing and future fleet.

1. (U) FY 1999 ACCOMPLISHMENTS:

- (U) (\$8.507) Continued development and validation of composite material design procedures and revision of the PC-based composite materials database. Evaluated composite materials for their corrosion control and reduced maintenance attributes. Continued scale modeling signature assessments. Continued development of Radar Cross Section (RCS), Infrared (IR), and Electronic Warfare (EW) prediction codes. Began development of improved baseline EM ENGINEERING toolset. Supported transition of AEM/S system to LPD-17 topside. Continued development of composite value family and advanced gas turbine genset feasibility study. Initiated development of heatpipe based bleed air heat exchanger.

R-1 SHOPPING LIST - Item No. 39-24 of 39-35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 24 of 35)

UNCLASSIFIED

	February 2000	
DATE:	PRO JECT NAME AND NI IMBER	Integrated Topside Design (ITD)/32470
EXHIBIT R-2a, RDT&E Project Justification	IDROGRAM EI EMENT NAME AND NI IMBER	Shipboard Sys Component Dev/0603513N
EXHIBIT	ADDODONATION/BIDGET ACTIVITY	RDT&E, N/BA-4

- (U) (\$4.515) Developed a modeling and simulation plan and a risk reduction plan for integrated topside design (ITD) activities. Initiated risk reduction test in support of DD 21 Industry Team ITD risk reduction plan.
- 2. (U) FY 2000 PLAN:
- (U) (\$2.953) Continue validation of composite material design procedures and revision of the PC-based composite materials database. Continue evaluation of composite materials for their corrosion control and reduced maintenance attributes. Continue development of RCS, IR, and EW prediction codes. Validate and improve EM Engineering Tools. Develop Infrared Signature Database Update. Validate and publish Low Observable (LO) Model scaling techniques.

 - (U) (\$9.803) Initiate engineering efforts required to begin initial system design of an Integrated Topside Design for DD 21.
 (U) (\$1.000) Continue development of heat pipe based bleed air heat exchanger and affordable HM&E machinery and architectures for existing and future fleet. Complete advance gas turbine genset feasibility design study.
- 3. (U) FY 2001 PLAN:
- (U) (\$3.693) Continue validation of composite material design procedures and revision of the PC-based composite materials database. Evaluate composite materials for their corrosion control and reduced maintenance attributes. Continue development of RCS, IR, and EW prediction codes. Continue to validate and improve EM Engineering
- (U) (\$10.387) Complete engineering efforts required for initial system design of DD21 ITD. Begin ITD system/subsystem design for DD 21.
- (U) (\$1.000) Complete heat pipe based bleed air heat exchanger. Continue development of affordable HM&E machinery and architectures for existing and future fleet.

B. (U) OTHER PROGRAM FUNDING SUMMARY:

161.118 305.274 303.989	COST (\$ in Millions) FY 2000 FY 2001	11 FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
	al Ship Systems/Engineering/0604300N 120.704 161.118		617.796	763.620			CONT.

39-25 of 39-35 R-1 SHOPPING LIST - Item No.

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 25 of 35)

UNCLASSIFIED

EXHIBI	EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4	PROGRAM ELEMENT NAME AND NUMBER Shipboard Sys Component Dev/0603513N	PROJECT NAME AND NUMBER Integrated Topside Design (ITD)/32470	
C. (U) ACQUISITION STRATEGY:			
(U) These development efforts were realigned into this project in strategy in FY 2000 and out.		d DD 21 RDT&E efforts ar	an effort to consolidate related DD 21 RDT&E efforts and will be transitioned into the DD 21 acquisition
D. (U) SCHEDULE PROFILE:			
	PROGRAM MILESTONES	1	
FY1999	FY 2000	ţ	FY 2001
2Q C_Missile Update 4Q RCS Medium Scale Model Test Results 4Q Final LPD Mast EM/Signature/Structural Design 4Q EM Engineering Baseline Upgrade 4Q Complete Structural Design Guide 4Q ITD M&S and Risk Reduction Plans 2Q Solar Conceptual Design Data 4Q Gen Set Studies Complete 4Q 3 Way Ball Valve Drawing and ILS Package 4Q Allison Conceptual Design Data	tts 4Q EM Engineering Tool Validation & Upgrade 4Q RCS, IR, EW Code Updates 4Q Composite Design Guide Updates 2Q G.T. Genset Assessment Report 4Q 2 Way ball valve ILS package ckage		4Q RCS/IR/EW Code Updates 4Q EM Engineering Tool Validation & Improvement 4Q Composite Design Guide Updates

R-1 SHOPPING LIST - Item No. 39-26 of 39-35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 26 of 35)

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CLASSIFICATION:

				:				DATE.				
Exhibit R-3 Cost Analysis (page 1)	ge 1)							i		February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	/ITY	PROGRAM ELEMENT	1			PROJECT N	PROJECT NAME AND NUMBER	ABER				
RDT&E, N/BA-4		Shipboar	Shipboard Sys Com	np Dev/0603513N	13N	Integrated T	Integrated Topside Design/32470	n/32470				
Cost Categories	Contract	Performing			FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Activity &	PY s	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Iype	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	or Contract
Primary Hardware Development	Sec845/804	Sec845/804 DD 21 Industry Teams	0.000	4.515	11/98	9.803	11/99	10.387	11/00	CONT.	CONT.	
Ancillary Hardware Development											0.000	
Systems Engineering											0.000	
Licenses											0.000	
Toolina											0.000	
GFE											0000	
Award Fees											0.000	
Subtotal Product Development			0000	4.515		9.803		10.387		CONT.	CONT.	
Engine Company	dWI	NSWC CD Bothoods MD	5 532	4 240	12/9R	2 282	12/99	2 933	12/00	TNOS	TNOO	
		Company of the Compan	100.		2000	2000	7000	277	00/04	F	FIACO	
	XX MX	NKL Suitland, MD	coo.r	1.280	86/71	0.622	66/71	0.747	00/7	. I	. I	
	Varions	Other Gov't Activities	0.120	0.875	12/98	0.225	12/99	0.225	12/00	CONT.	CON .	
	RC	NAVLOGCTR, PA	0.000	0.983	12/98	0.450	12/99	0.500	12/00	CONT.	CONT.	
	Varions	Other Contractors	2.054	0.376	12/98	0.199	12/99	0.033	12/00	CONT.	CONT.	
Software Development	C/CPFF	TBD	1.508	0.638	66/60	0.175	12/99	0.255	12/00	CONT.	CONT.	
	MP	JSC Annapolis, MD	0.210	0.145	12/98	0.000	N/A	0.000	A/A	CONT.	CONT.	
Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			10.429	8.507		3.953		4.693		CONT.	CONT.	
Remarks:												

R-1 SHOPPING LIST - Item No. 39-27 of 39-35

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 27 of 35)

UNCLASSIFIED

								DATE:		C C	9	
Exhibit R-3 Cost Analysis (page 2)										repruary 2000	8	
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT	EMENT			PROJECT NA	PROJECT NAME AND NUMBER	1BER				•
RDT&E, N/BA-4		Shipboard Sys Comp Dev/0603513N	ys Comp De	ev/0603513	z	Integrated T	Integrated Topside Design/32470	n/32470				
Cost Categories Contract	<u>.</u>		Total PV s	FY 99	FY 99 Award	FY 00	FY 00 Award	FY 01	FY 01 Award	Cost to	Total	Target Value
	Location		Cost	Cost	Date	Cost	Date	Cost		Complete	Cost	of Contract
Test & Evaluation												
Operational Test & Evaluation											0.000	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			0.000	0.000		0000		0.000		0.000	0.000	
Remarks:												
Contractor Engineering Support											0.000	
Program Management Support											0.000	
Miscellaneous											0.000	
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		CONT.	CONT.	
Remarks:												
Total Cost	-		10.429	13.022		13.756		15.080		CONT.	CONT.	
Remarks:											:	
			R-1 SHOP	SHOPPING LIST - Item No.	- Item No.	39-28 of 39-35	-35					

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 28 of 35)

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EXHIBIT R-2	EXHIBIT R-2a, RDT&E Project Justification	lustification				DATE:			
							Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY PR	PROGRAM ELEMENT NAME AND NUMBER	AME AND NUMBE	R	PROJECT NA	PROJECT NAME AND NUMBER	3ER			
RDT&E, N/BA-4 Sh	Shipboard Sys Com	Component Dev/0603513N	603513N	Integrated Pc	Integrated Power Systems (IPS)/32471	(IPS)/32471			
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost	(1)	25.723	84.057	106.277	69.342	26.860	9.957	CONT.	CONT.
RDT&E Articles Qty	0	0	0	0	0	0	0	CONT.	CONT.

-unds from PE 0603573N/Project S1314 (only Integrated Power Systems) transitioned into PE 0603513N/Project 32471 in FY 2000 and out. Note (1) (U) FY 1999 funds were budgeted and executed under PE 0603573N/Project S1314 as displayed in the FY99 President's Budget exhibits.

- A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project supports the Integrated Power Systems (IPS) program. IPS provides total ship electric power, including electric propulsion, power conversion and distribution, and mission load interfaces to the electric power system. IPS supports multiple ship class applications integrated power architecture. The goals of the IPS are to reduce acquisition and operating costs of naval ships and increase military effectiveness. These goals are to be for future surface ships, with DD21 being the primary ship application target. On 6 January 2000, SECNAV announced Navy intent that DD21 be an electric drive ship with accomplished by leveraging investments in technologies that will be usable by both military and commercial sectors.
 - The flexibility of electric power transmission allows power generating modules with various power ratings to be connected to propulsion loads and ship service in any arrangement that supports the ship's mission at lowest overall cost. Systems engineering in IPS is focused on increasing the commonality of components used across ship types and in developing modules which will be integral with standardization, zonal system architectures, and generic shipbuilding strategies. The purpose of increased - (U) IPS has the potential to revolutionize the design, construction and operation of U.S. naval ships by using electricity as the primary energy transfer medium aboard ship. commonality is to reduce the total cost of ship ownership by using common modules composed of standard components and/or standard interfaces.
- (U) IPS addresses ship platform program goals through: reduced ship acquisition cost through integration of propulsion and ship's service prime movers; lower ship operational costs resulting from more flexible operating characteristics and more efficient components; reduced ship construction costs by allowing more extensive modular construction of power generation, distribution, and loads if desired; improved ship survivability and reduced vulnerability through increased arrangement flexibility and improved electrical system survivability; reduced manning through improved power management systems and reduced on-board maintenance requirements; improved ship signature characteristics, if required; improved design adaptability to meet future requirements of multiple ship types or missions; integrating power management and protection by fully utilizing the power electronics in the system to perform fault protection as well as power conversion and load management functions; simplified technology insertion which allows new technologies to be installed within IPS much more inexpensively than presently possible; and, reduced machinery system acquisition costs through utilization of commercially shared technologies and components. The efforts in this project are divided into three major areas as follows:

R-1 SHOPPING LIST - Item No. 39-29 of 39-35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 29 of 35)

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EXHIBI	EXHIBIT R-2a, RDT&E Project Justification	DATE:	
			February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	Shipboard Sys Component Dev/0603513N	Integrated Power Systems (IPS)/32471	

- (U) System development: IPS development consists of the efforts necessary to develop and demonstrate warfighting and cost reduction requirements, as well as related risk reduction for ship platform applications. System development also includes all efforts to qualify and test integrated power system equipment for DD21.
- backfit IPS components and conduct at sea testing is built into the MOU. The US financial contribution to the MOU is also funded from this project. A contract for construction of the demonstrator was awarded in July, 1998. The efforts in this project support the at sea testing on the Trimaran Demonstrator. - (U) At Sea Testing: At Sea Testing of IPS subsystems and components will be conducted on the Trimaran Demonstrator developed and built under a US/UK cooperative Memorandum of Understanding (MOU) signed 3 September 1997. Initial testing on the Trimaran will focus on Naval Architectural and sea-keeping aspects of the Trimaran hull form. The Trimaran is being constructed initially with a commercial electric drive system as well as provisions for fitting IPS components. An opportunity for the US to
- (U) Mission Load Interfaces: Studies have shown that significant opportunities exist to reduce the cost and improve the performance of combat and auxiliary systems by providing the type and quantity of power required directly to the user system. Traditional methods provide standard power and require individual users to perform multiple conversions and conditioning steps prior to use. The efforts in this project provide for initial studies, development, and testing.

1. (U) FY 1999 ACCOMPLISHMENTS:

Completed integration of all advanced development equipment. Conducted advanced development testing at the Land Based Engineering Site (LBES) at NSWCCD Philadelphia PA to: verify and characterize individual component performance; verify that system design requirements are met and validate design tools; verify that requirements for power quality are met throughout the advanced development system; characterize system interfaces for use in future performance/interface specifications; industry teams: evaluated the differences between conventional mechanical drive systems and other advanced technologies, including permanent magnet motors for the integrated power system architecture concept options based on industry specific approaches to DD21 design. Began combat systems interface studies to determine areas where combat system performance can be improved or where cost can be reduced. Commenced a DT Assist by COMPTEVFOR. Developed system description and concept of operations for modular survivable distribution architecture to be demonstrated at LBES. Supported the OSD business case study of Integrated Power systems, - (U) (\$30.195) Systems Development: Continued development of IPS. Completed factory acceptance testing (FAT) of the FSAD propulsion motor/converter. Took delivery Ship Service Distribution System (SSDS) equipment and propulsion motor/converter. Completed Installation and Checkout (INCO) of propulsion motor/converter. and validate the distributed control system architecture, system design, and performance. Provided testing feedback to DD 21 design teams. In conjunction with DD21 Common Electric Drive technologies, and further warfighting benefits of Integrated Power Systems.

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 30 of 35)

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	DATE:
		February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	Shipboard Sys Component Dev/0603513N	Integrated Power Systems (IPS)/32471
- (U) (\$0.600) At Sea Testing: Note: At se	a testing of IPS subsystems and components will	- (U) (\$0.600) At Sea Testing: Note: At sea testing of IPS subsystems and components will be conducted on the Trimaran Demonstrator developed and built under a

- US/UK cooperative MOU. Began system analysis and design.
 - (U) (\$1.045) Mission Load Interfaces: Commence assessment of C4I electronic load interfaces. Commence development of Variable Speed Drive (VSD) motor controller for auxiliary applications.

2. (U) FY 2000 PLAN:

- integrated power system components via DD21 Industry Teams. Commence advanced development design of permanent magnet motors.
 (U) (\$0.800) At Sea Testing: Note: AT sea testing of IPS subsystems and components will be conducted on the Trimaran Demonstrator developed and built under a cost analysis, producibility studies, manning studies, module development, ship integration, architecture design and related efforts. Continue support for DD 21 development Atomics, San Diego, CA., Alstom Drives and Controls, Rugby, United Kingdom, L3 Communications SPD Technologies, Inc. Power Systems Group Anaheim, CA., Northrop - (U) (\$23.823) Systems Development: Continue IPS design, development, and integration including performance analysis and testing, modeling and simulation, life cycle and design efforts as well as support for other ship platforms. Continue advanced development testing at NSWCCD, Philadelphia PA, including controls and power management upgrades, demonstrating various operational modes, and incorporating multi workstation control and automated reconfiguration. Award 804/845 Agreements in Grummon Marine Systems, Sykesville, MD. IFTP Agreements will be awarded to mitigate potential risks associated with a fielded IPS system. Efforts include completing December 1999 for Integrated Fight Through Power (IFTP) to Silicon Power Corporation, Exton, PA., Eaton Corporation - Navy Controls Division, Milwaukee, WI., General preliminary design and beginning detailed design of hardware required to replace Functional Equivalent Modules (FEMs) and populate IPS baseline configuration for survivability testing. Continue propulsion motor analysis using the reduced scale Laboratory Drive Motor. Commence preparations for qualification and test of DD21
- US/UK cooperative MOU. Continued design of the Trimaran IPS configuration for at-sea testing. Begin development of IPS control system modifications for use during atsea testing.
 - (U) (\$1,100) Mission Load Interfaces: Conduct initial combat systems/survivability demonstration to show improved performance and potential to reduce combat system costs. Continue development of VSD motor controller for auxiliary applications. Continue assessment of C4I electronic load interfaces.

(U) FY 2001 PLAN

simulation/stimulation capability for total system risk reduction. Continue support for DD21 design efforts and planned down-select to a single ship concept as well as support baseline configuration for survivability testing. Demonstrate the survivability and zonal isolation/fight through features of the advanced development system. Demonstrate - (U) (\$75.438) Systems Development: Continue IPS design, development, and integration including performance analysis and testing, modeling and simulation, life cycle cost analysis, producibility studies, manning studies, module development, ship integration, architecture design and related efforts. Continue upgrading IPS for other ship platforms. Complete acoustics testing of the IPS FSAD motor. Continue advanced development testing at NSWC CD, Philadelphia PA. Continue IFTP efforts to mitigate potential risks associated with a fielded IPS system. Efforts include completing detailed design and begin fabrication of hardware required to populate IPS automated system reconfiguration and start up.

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 31 of 35)

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EXHIBI	EXHIBIT R-2a, RDT&E Project Justification	DATE:	February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	Shipboard Sys Component Dev/0603513N	Integrated Power Systems (IPS)/32471	

DD21integrated power system components for system testing. Continue advanced development of permanent magnet motors and other advanced power system Continue qualification and test of DD21 integrated power system components via DD21 Industry Teams. Commence Long Lead Material (LLM) procurement of technologies.

US/UK cooperative MOU. Provide funding for the Trimaran under the terms of the US/UK MOU. Complete detailed design and begin procurement of hardware required for at sea testing. Continue detailed development and design of the Trimaran IPS configuration for at sea testing. Continue development of IPS control system modifications for - (U) (\$8.619) At Sea Testing: Note: At sea testing of IPS subsystems and components will be conducted on the Trimaran Demonstrator developed and built under a use during at-sea testing.

B. (U) OTHER PROGRAM FUNDING SUMMARY:

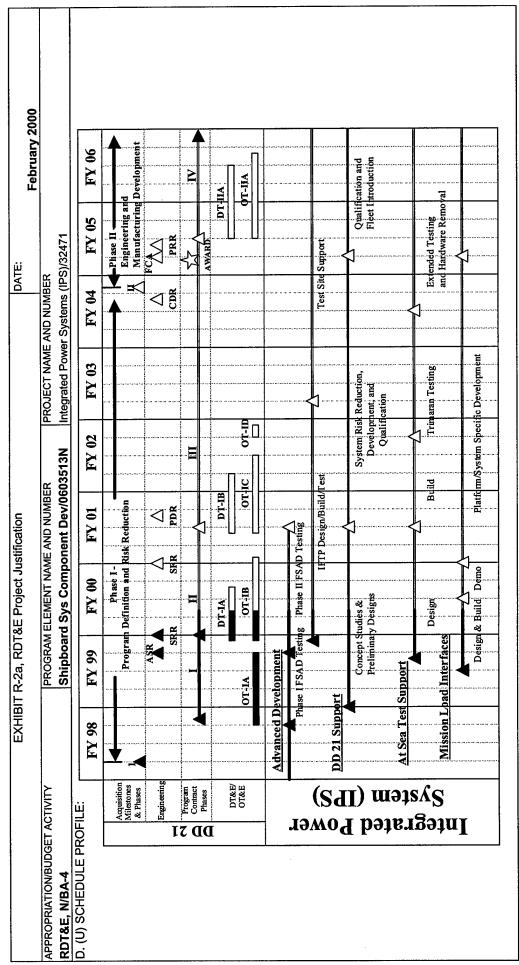
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
SC-21 Total Ship Systems/Engineering/0604300N	120.704	161.118	305.274	303.989	617.796	763.620	857.350	CONT.	CONT.

C. (U) ACQUISITION STRATEGY: (U) IPS is a candidate system for DD-21 and all other future surface ships.

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 32 of 35)

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R-1 SHOPPING LIST - Item No. 39-33 of 39-35

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 33 of 35)

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								DATE:				
Exhibit R-3 Cost Analysis (pag	je 1)							i		February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	, LIJ	PROGRAM ELEMENT	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	ABER				
RDT&E, N/BA-4		Shipboard Sys Co	Sys Comp	mp Dev/0603513N	I3N	Integrated P	Integrated Power System/32471	/32471				
Cost Categories (Tailor to WBS, or System/Item	Contract Method	Performing Activity &		FY 99	FY 99 Award	FY 00	FY 00 Award	FY 01	FY 01 Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date 12/00	Complete	Cost	of Contract
Primary Hardware Development	C/CPAT	Soc845/804 DD 21 Industry Teams	9.417	4 000	06/30	15 770	11/99	48 645	12/00	LNCO	CONT	
	Sec845/80	Sec845/804IFTP Teams	0.000	1.200	05/20	3.248	12/99	20.543	12/00	CONT.	CONT.	
	US/UK MOU	US/UK MOU DERA, UK	0.000	0.000	N/A	0.000	A/N	1.630	12/00	CONT.	CONT.	
	WR	NSWCCD Annapolis, MD	3.030	4.845	12/98	2.100	12/99	6.657	12/00	CONT.	CONT.	
	MISC	Other Contractors	1.160	1.525	12/98	1.100	12/99	2.500	12/00	CONT.	CONT.	
	MISC	Other Govt Activities	0.002	0.856	12/98	0.100	12/99	0.482	12/00	CONT.	CONT.	
Ancillary Hardware Development											0.000	
Systems Engineering											0.000	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees	C/CPAF	Lockhead M Syracuse, NY	0.801	0.670	12/99	0.272	08/00	TBD				
Subtotal Product Development			14.410	25.751		22.590		80.457		CONT.	CONT.	
Remarks:								٠				
Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data										-	0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
			R-1 SHO	R-1 SHOPPING LIST - Item No.	- Item No.	39-34 of 39-35	9-35					

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 34 of 35)

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								DATE:				
Exhibit R-3 Cost Analysis (page 2)	ge 2)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	YTI)	PROGRAM ELEMENT	EMENT			PROJECT NA	PROJECT NAME AND NUMBER	(BER				
RDT&E, N/BA-4		Shipboard Sys Comp Dev/0603513N	Sys Comp D	ev/0603513	Z	Integrated P	Integrated Power System/32471	/32471				
Cost Categories	Contract	Performing	Total		FY 99		FY 00					
(Tailor to WBS, or System/Item	Method	Activity &	PYs	FY 99	Award	_	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost	Cost	Date		Date	Cost		Complete	Cost	of Contract
Developmental Test & Evaluation	WR	NSWC CD Philadelphia, PA	3.050	5.988	12/98	3.033	12/99	3.500	12/00	CONI.	CON .	
Operational Test & Evaluation											0.000	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			3.050	5.988		3.033		3.500		0.000	CONT.	
Remarks:												activa and
											000 0	
Contractor Engineering Support												
Program Management Support										11.	0.00	
Miscellaneous	Various	Various	0.100	0.101	12/98	0.100	12/99	0.100	A/A	CONT.	CON .	
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.100	0.101		0.100		0.100		CONT.	CONT.	
Remarks:												
100	-		17 560	34 840		25 723		84 057		TNCC	CONT	
I otal Cost			000:11	01.040		23.123		200.20				
Remarks:												
			R-1 SHOF	R-1 SHOPPING LIST - Item No.	- Item No.	39-35 of 39-35	-35			• • • •	•	

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 35 of 35)

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EXHIBIT R-2, RDT&E Budget Item Justification	, RDT&E BI	udget Item J	ustification				DATE:			
								Febn	February 2000	
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE	AENCLATURE		-		
RESEARCH DEVELOPMENT TEST & EVALUATION	VALUATION, NAVY/BA-4	3A-4			Radiologica	Radiological Controls/0603542N	303542N			
COST (\$ in Millions		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003		FY 2005	FY 2004 FY 2005 Cost to Complete Total Cost	Total Cost
Total PE Cost		3.227	0.601	0.572	0.566	0.634	0.614	0.602	CONT.	CONT.
RADIAC Development/S1830		3.227	0.601	0.572	0.566	0.634	0.614	0.602	CONT.	CONT.
Quantity of RDT&E Articles										

A. Mission Description and Budget Item Justification:

equipment. New requirements for the measurement of lower neutron levels necessitate the development of modernized instrumentation. The program is critical to joint-service radiation safety initiatives within DOD and has been coordinated with Army, Air Force, and Defense Nuclear Agency personnel to achieve the maximum cross-service safety requirements. The Multifunction RADIAC will cut calibration costs and reduce the requirements for spare parts by replacing over 16 different models of obsolete by providing accurate, reliable Health Physics instrumentation at the lowest possible life cycle cost. Reliable radiation monitoring instruments are needed to ensure the radiological safety of Navy personnel. This includes hand-held RADIAC meters, personnel dose measurement devices, and area monitors used to measure radiation fields. The Navy Dosimetry System will be able to meet new NRC regulations and will provide sensitive measurements down to the levels required for all new and imminent health and Project S1830 coordinates all Navy efforts for the development of nuclear radiation detection devices in direct support of the Navy Nuclear Propulsion Program and other applicability.

Multifunction RADIAC (MFR), OR #176-04-86 Neutron Dosimetry System, OR #179-04-87 Navy Dosimetry System, OR #180-04-87

Automated RADIAC Calibration and Diagnostics System, OR #175-04-86 Underwater RADIAC System, OR #178-04-88

Wide Range Survey Meter, OR #177-04-87

Tritium Monitors, OR #182-04-89

EOD Personal Dosimeter, OR #181-04-87 (Updated 09 MAR 95 as 392-04-95)

R-1 SHOPPING LIST - Item No. 44

(Exhibit R-2, page 1 of 6) Exhibit R-2, RDT&E Budget Item Justification

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EXHIBIT R-2, RDT&E Budget Item Justification		DATE:	Feb-00	
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	R-1 ITEM NOMENCLATURE Radiological Controls/06	R-1 ITEM NOMENCLATURE Radiological Controls/0603542N		
(U) Program Accomplishments and Plans:				<u>,</u>
FY 1999 ACCOMPLISHMENTS: - (U) (\$1.020) Continued development and began testing of Navy Dosimetry System. - (U) (\$1.020) Continued development and began testing of Navy Dosimetry System. - (U) (\$1.349) Continued development of MFR extendable probe, directional gamma probe, and alpha probe, and compact neutron probe. Began MFR control unit enhancement and MFR frisker station development. - (U) (\$.196) Completed development of Underwater RADIAC System. - (U) (\$.112) Completed development of Casualty Dosimeter. - (U) (\$.550) Began enhancements to Air Particle Detectors.	tem. Ima probe, and alpha probe,s	and compact neutro	n probe.	
FY 2000 PLAN: - (U) (\$.301) Complete the development of Navy Dosimetry System (U) (\$.300) Complete the development of MFR directional gamma probe. Continue the development of extendable probe and frisker station.	tinue the development of ext	endable probe and	frisker station.	
FY 2001 PLAN: - (U) (\$.286) Begin enhancement of Navy Dosimetry System (U) (\$.286) Complete the extendable probe and frisker station.				
B. Program Change Summary:			,	
FY 2000 President's Budget: Appropriated Value: Adjustment to FY 1999/2000 Appropriated Value/ FY 2000 President's Budget: FY 2000/01 President's Budget Submit:	FY 1999 3.600 3.600 -0.373 3.227	FY 2000 0.605 0.605 -0.004 0.601	FY 2001 0.573 -0.001 0.572	

R-1 SHOPPING LIST - Item No. 44

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 2 of 6)

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EXHIBIT R-2, RDT&E Budget Item Justification	RDT&E Budg	et Item Just	tification			Ω	DATE:	February 2000
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	4, NAVY/BA-	4		8 8	R-1 ITEM NOMENCLATURE Radiological Controls/06	R-1 ITEM NOMENCLATURE Radiological Controls/0603542N	3542N	
Change Summary Explanation: Funding: FY 99 decrease of \$.373M for minor adjustments. FY 00 decrease of \$.004M for minor pricing adjust FY 01 decrease of \$.001M is for minor pricing adjusted.	or minor adjustments. For minor pricing adjustments. Is for minor pricing adjustments.	ients. tments.						
Schedule: Not applicable. Technical: Not applicable.								
C. Other Program Funding Summary	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	To FY 2005 Complete	To Complete
OPN BLI: 292000 RADIAC	3.994	4.254	8.308	7.887	8.217	8.727	8.736	CONT.
D. Acquisition Strategy: Developmentefforts are being focused on evaluatio order to minimize total ownership costs. To the m	on,modificati naximum ext	on(as requi	red to meet new contra	operational Icts are targ	requirement eted for fixe	s), and adap d price effor	tation of Co ts to control	on evaluation,modification(as required to meet operational requirements), and adaptation of Commercial Off-The-Shelf technology in s. To the maximum extent possible new contracts are targeted for fixed price efforts to control development cost.
E. Schedule Profile: Dosimetry System Dosimetry System Delivery of Advance Development Systems – 2/00 Completion of Testing – 6/00 Milestone III Decision – 8/01 Initial Operational Capability – 12/02 MFR Enhancements/Probe Development Delivery of Prototypes for Extendable Probe (EP) – 1/99 Completion of Testing for EP – 4/99	2/00 EP) – 1/99							

R-1 SHOPPING LIST - Item No. 44

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 3 of 6)

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באחופון ה-2, הטומה מעטפנ ויפון טטאוווכאוטו	PATE: February 2000
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	R-1 ITEM NOMENCLATURE Radiological Controls/0603542N
MFR Enhancements/Probe Development con't. Delivery of Revised Prototype - 12/00 Completion of Testing of Revised Prototype-3/01 Production Contract Awarded for EP – 9/01 Delivery of Prototypes for Directional Gamma Probe (DGP) – 11/99 Completion of Testing for DGP – 3/00 Production Contract Awarded for DGP – 10/00 Award Contract Awarded for DGP – 10/00 Delivery of Frisker Station – 12/00 Completion of Testing of Frisker Station – 4/01 Production Contract Awarded for Frisker Station – 4/01 Production of Testing of Alpha Probe Samples for testing – 5/00 Completion of Testing of Alpha Probe – 9/00 Production Contract Award for Alpha Probe – 10/00	
Underwater RADIAC Delivery of Prototypes for Testing – 7/98 Completion of Testing – 5/99 Production Decision – 2/00 Initial Production Award – 2/00 Casualty Dosimeter Complete SBIR Phase II Testing – 1/99 IM-239 Enhancements Award Enhancement Contract – 3/00 Delivery of Test Samples – 12/00 Test and Evaluation Complete - 3/01	

R-1 SHOPPING LIST - Item No. 44

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 4 of 6)

CLASSIFICATION:

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								DATE:			5	
Exhibit R-3 Cost Analysis (page 1)										February 2000	9	
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT	EMENT			PROJECT NA	PROJECT NAME AND NUMBER	4BER				
RDT&E, N/BA-4		Radiologica	Radiological Control/0603542N	303542N		RADIAC De	RADIAC Development Project - S1830	Project - S18	30			
	Contract Performing		Total		FY 99		FY 00		FY 01			
or System/Item	hod Activity &			FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	/pe Location			Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
are Dev Dosimetry	P Various (See below)	below)	8.464	0.233	66/60	0.000		0.000		CONT.	CONT.	
Primary Hardware Dev MiscellaneousC/FP			5.212	0.880	Various			0.000		CONT.	CONT.	
Ancillary Hardware Development											0000	
Systems Engineering											0.000	
Consess											0.000	
Tooling											0.000	
Suma DEF											0.000	
Award Floor											0000	
Subtotal Product Development			13.676	1.113		0000		0.000		CONT.	CONT.	
											0000	
Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: Not applicable												
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R-1 SHOPPING LIST - Item No. 44

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 5 of 6)

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Exhibit R-3 Cost Analysis (page 2) APPROPRIATION/BUDGET ACTIVITY RDT &E, N/BA-4 Cost Categories (Tailor to WBS, or System/Item Method Acquiremental Test & Evaluation WR Vacquiremental WR Vacquiremental Test & Evaluation WR Vacquiremental Test & E	Radiol Radiol Performing Activity & Location Various	PROGRAM ELEMENT Radiological Control/0603542N Total PY s PY s Cost Cost Cost Cost 0.329 0.329 0.329		FY 99 Award Date 10/98 10/98	PROJECT NAME AND NUMBER RADIAC Development Proje FY 00 Award FY Cocst Date Cost 0.197 12/99	ME AND NUM velopment P FY 00 Award Date 12/99	PROJECT NAME AND NUMBER RADIAC Development Project/S1830 FY 00 FY 00 FY 00 FY 01 Cost Date Cost 0.197 12/99 0.188	PFY 01 Award Date 10/00	February 2000 Cost to TOONT.	Total CONT. 0.329 0.000 0.000	Target Value of Contract
RIATION/BUDGET ACTIVITY I. N/BA-4 Goories Outlact Nethod Nethod Method		logical Control/06 Total Py's Cost Cost Cost Cost Cost Cost Cost Cos		866	PROJECT NAI RADIAC De FY 00 Cost 0.197	ME AND NUM Velopment P FY 00 FY 00 Award Date 12/99	3ER roject/S1830 Cost 0.188	Awa Date	Cost to Complete CONT. CONT.	1 - 1 1 1 1 1 1 1 1	Target Value of Contract
in NIBA-4 Contract Gegories VWBS, or System/ltem Method & Type Mental Test & Evaluation MR mail Test & Evaluation il T&E il T&E ks:		logical Control/060 Total Py s Py s Cost (2.994		86,88	RADIAC Dev Cost 0.197 0.197	velopment P FY 00 Award Date 12/99	roject/S1830 FY 01 Cost 0.188	Awa Awa	Cost to Complete CONT.	1 _ 1 1 1 1 1 1 1	Target Value of Contract
legories Contract VWBS, or System/ltem Method WB4 Type Mental Test & Evaluation WR mail Test & Evaluation MR MR MR MR MR MR MR MR MR MR MR MR MR		Total PY's Cost Cost 2.394 2.394 2.394		868	761	66	Cost 0.188	FY 01 Award Date 10/00	Cost to Complete CONT.		Target Value of Contract
o WBS, or System/Item Method ments) R Type Mental Test & Evaluation WR mail Test & Evaluation WR si T&E Ks:	ctivity & castion arious	994	529	888	197	66	Cost 0.188	Award Date 10/00 10/00	Cont to Continue Cont.	_ 1 1 1 1 1 1 1	of Contract
mental Test & Evaluation WR nal Test & Evaluation MR nal Test & Evaluation NR nal Test & Evaluation NR nal T&E ks:	arious	994	229	986/0	197	66	0.188	10/00	CONT.		
nal Test & Evaluation al T&E ks:		2.994	0.658	10/98	0.197		0.188		CONT.	0.329 0.000 0.000 0.000	
Tooling GFE Subtotal T&E Remarks:		2.994	0.658		0.197		0.188		CONT.	0000 0000 CONT.	
GFE Subtotal T&E Remarks:		2.994	0.658		0.197		0.188		CONT.	0000 0000 0000 0000	
Subtotal T&E Remarks:		2.994	0.658		0.197		0.188		CONT.	CONT.	
Remarks:										900	
							_			200	
Contractor Engineering Support										200.5	
nt WR	Various	4.716	0.329	10/98	960.0	12/99	0.091	10/00	CONT.	CONT.	
WR	Various	4.717	0.329	10/98	960.0	12/99	0.090	10/00	CONT	CONT.	
Travel		0:000	0.010	10/98	0.010	12/99	0.010	10/00	CONT.	CONT.	
Labor (Research Personnel)			0.788	10/98	0.202	12/99	0.193	10/00		1.183	
Overhead									1	0.000	
Subtotal Management		9.433	1.456		0.404		0.384		CONT.	CONI	
Remarks:											
Total Cost		26.103	3,227		1090		0.572		CONT.	CONT.	
Remarks:											

R-1 SHOPPING LIST - Item No. 44

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 6 of 6)

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										-
EXHIBIT R-2, RDT&E Budget Item Justification	, RDT&E Bu	dget Item Ju	stification				DATE:	Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE	MENCLATURE	4 1010 4 0721			
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY	ON, NAVY				PE UBUSDOSN	Surrace ASW/	PE 0603553N Sunace ASW/V 1704 ASW Adv Dev	av Dev		
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Total PE Cost		4.839	6.948	6.752	2.986	3.031	3.074	3.114	Continuous	Continuous
ASW Advanced Development/V1704		4.839	6.948	6.752	2.986	3.031	3.074	3.114	Continuous	Continuous
Project B Title/Cost Code						·				0.000
Project City Code										0.000
Ouantity of RDT&E Articles										
						denie a management	tobilon became	planet took	a constitution of the formation of the section of t	10000000

associated with the development of a Netcentric ASW program. The Netcentric ASW program will provide commonality accross platforms, with common decision aids, models and a common database. and combat system applications. Efforts focus on resolution of technical issues associated with providing capability against the Year 2005 and beyond threat with emphasis on shallow water/littoral area USW and on dem/val of Undersea Warfare (USW) concepts and technology. Key technology areas include active sonar transmissions, advanced signal and data processing, active sonar classification, towed and hull arrays and transducer technology, multi-static sonar, and multi-sensor data fusion including multi-platform data fusion and netcentric undersea warfare concepts. The development of a midfrequency Towed Active Receive Subsystem (TARS) prototype, which functions as a deep receiver for the AN/SQS-53C transmitter and provides significantly enhanced submarine detection performance against deep submarine targets, will complete in FY1999 and transition to the AN/SQQ-89 program. This Program Element, 0603553N, has been designated to support Multi-Static Sonar efforts associated with the Distant Thunder program in order to transition from a DARPA program into the Navy Multistatic Active ASW Program. This project conducts advanced developmentand testing of active multistatic acoustic concepts. The concept development is directed at providing surface ships combat groups with the capability of detection, classification, and localization of quiet threat submarines in difficult acoustic environments associated with Littoral waters. The project concentrates on the development of acoustic processor algorithms and information sharing technologies to develop a coordinated multistatic acoustic picture employing distributed sensors and active sources. The Program Element, 0603553N, has also been designated to provide Advanced Undersea Warfare Concepts (AUSWC) A. Mission Description and Budget Item Justification: The ASW Advanced Developmentproject provides advanced developmentdemonstration and validation of technology for potential surface sonar

Note: In accordance with 15 USC 638, \$.15M in FY 2000 is reserved for the Small Business Innovative Research (SBIR) assessment.

Program Plans and Accomplishments:

1. (U) FY 1999 Accomplishments:

(\$1.400) Advanced Undersea Warfare Concept (AUSWC): Provide Systems Engineering and Integration for development of the AUSWC Builds 1.0 and 2.0. Perform Battle Group (\$1.044) TARS: Completed TARS test and evaluation program and completed the transition of this technology to the AN/SQQ-89 Multi-Functional Towed Array (MFTA). (\$2.395) Multistatic Active ASW: Participated in SHAREM 127 and 130 and LWAD 99-2 sea tests for Implusive Multistatic Active Asous gata collection and demonstration. platform interface investigation, installation planning and scheduling, platform installation and integration for AUSWC first build.

2. (U) FY 2000 Plan:

(\$2.949) Multistatic Active ASW: Improve acoustic processors and communication schemes. Participate in sea tests (SHAREMS/LWAD) to collect multi-static processors/communication systems data and environmental acoustic data and analyze system performance. Initiate development of Concept of Operations. (\$3.999) Advanced Undersea Warfare (obswc): Field and demonstrate a network-centric Undersea Warfare (USW) theater combat system to support air, surface, and sub-surface platforms. Support first installation (Build 1.0) plan for Kitty Hawk Battlegroup for selected battlegroup platform

R-1 SHOPPING LIST - Item No. 45 -1 of 45-5

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 5)

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Enclosure (12)

EXHIBIT R-2, RDT&E	RDT&E Budget Item Justification			DATE: February 2000
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY		R-1 ITEM P PE 060355	R-1 ITEM NOMENCLATURE PE 0603553N Surface ASWA	/1704 ASW Adv Dev
3. FY 2001 Plan: (\$2.971) Mulstatic Active ASW: Continue improvement of acoustic multi-static algorithms based on results of FY2000 sea test results. Participate in sea te (\$2.971) Mulstatic Active ASW: Continue improved algorithms/communication schemes in Littoral ASW environments. Complete Concept of Operatio (\$1.4AREMS/LWAD) to evaluate improved algorithms/communication schemes in Littoral ASW environments. Complete Concept (AUSWC): Continue to demonstrate a network-centric Undersea Warfare (USW) theater combat system to support air, surface, and sub-surface platforms. Support second installation (Build 2.0) plan for Vinson Battlegroup for selected battlegroup platform	oustic multi-static algorith nication schemes in Littor continue to demonstrate a econd installation (Build 2	ims based on results of all ASW environments network-centric Under (0) plan for Vinson Be	of FY2000 sea s. Complete C rrsea Warfare (rttlegroup for s	test results. Participate in sea te Concept of Operatio (USW) theater combat system selected battlegroup platform
B. Program Change Summary: FY 2000 President's Budget: Appropriated Value: Adjustment to FY 1999/2000 Appropriated Value FY 2000 President's Budget:	FY 1999 11.871 11.871 -7.032	FY 2000 2.949 2.949 3.999	FY 2001 2.963 3.789	
FY 2001 President's Budget Submit:	4.839	6.948	6.752	2
oility Adjustment atic Active ASW , Advanced Und)) Advanced Und ng Adjustments ((-\$10.794), Undistributed Reductions (-\$0.129), SBIR/STTR Transfer (-\$0.031) increase (+\$2.400), AUSWC increase (+1.400). Minor Pricing increase (+\$0.12 ersea Warfare Concept (AUSWC) ersea Warfare Concept, Strategic Sourcing Redistribution of (+\$0.037), NWCF reso.993).	ns (-\$0.129), SBIR/S7 ase (+1.400). Minor F Sourcing Redistributic	TTR Transfer (. Pricing increase in of (+\$0.037)	-\$0.031) e (+\$0.12), NWCF rates adjustments of (+\$0.035).
Schedule: N/A				
Technical: N/A				
C. Other Program Funding Summary: N/A				
Related RDT&E:				
PE 0205620N (Surface ASW Combat Systems Integration) PE 0602121N (Surface Ship & Submarine HM&E Technology) PE 0603504N (Advanced Submarine Combat Systems Development) PE 0603513N (DD-21 Associated System Development) PE 060351N (Advanced Submarine System Development) PE 0603561N (Advanced Submarine System Development) PE 0603747N (Undersea Warfare Advanced Technology)				

R-1 SHOPPING LIST - Item No. 45-2 of 45-5

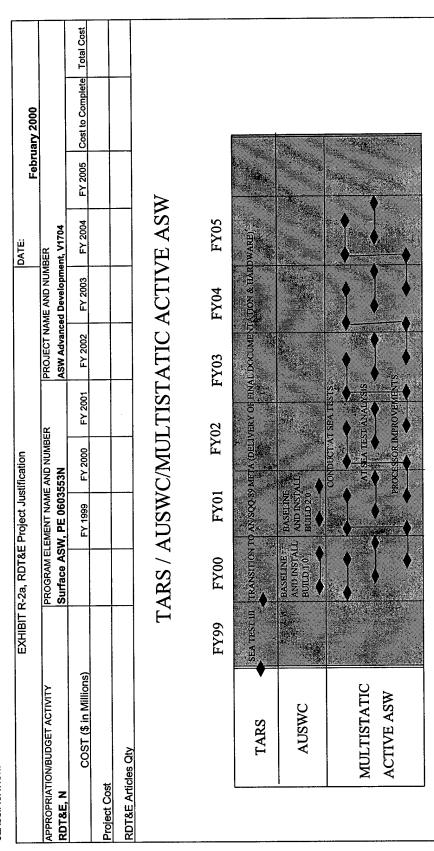
D. Acquisition Strategy: Plan to continue competitively awarded contract(s).

E. Schedule Profile: See attached Schedule.

Exhibit R-2, RDT&E Budget ttem Justification (Exhibit R-2, page 2 of 5)

Enclosure (12)

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R-1 SHOPPING LIST - Item No. 45-3 of 45-5

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 3 of 5)

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CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)	Je 1)							DATE:		February 2000	01	
APPROPRIATION/BUDGET ACTIVITY	/IT/	PROGRAM ELEME	ELEMENT NAM	NT NAME AND NUMBER	ER	PROJECT N	PROJECT NAME AND NUMBER	/BER				
RDT&E. N		Surface ASW/	SW/ PE 0603553N	3553N		ASW Advance	ASW Advanced Development/V1704	ent/V1704				
Cost Categories	Contract	Contract Performing	Total		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Method Activity &	PY s	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
TARS Product Development	WR	NUWC	9.597	0.800	11/98	0.000	•	0.000			10.397	
Multistatic Sonar Development	WR	NAWC/Pax River		0.100	03/88	0.200	12/99	0.225	12/00	Continuous	Continuous	
Multistatic Sonar Development	CPFF	BBN				0.200	01/00	0.235	01/99	Continuous	Continuous	
Multistatic Sonar Development	CPFF	APL/JHU		0.116	03/99	0.234	01/00	0.328	01/89	Continuous	Continuous	
Multistatic Sonar Development	RCP/WR NRL	NRL		0.212	66/20					Continuous	Continuous	
Multistatic Sonar Development	2 2 2	ONR		0.868	04/99					Continuous	Continuous	
AUSWC	WR	NUWC/Keyport		1.400	66/20					Continuous	Continuous	
Systems Engineering	WR	NSWC/DD		0.108	66/90					Continuous	Continuous	
Subtotal Product Development			9.597	3.604		0.634		0.788		0.000	14.623	

Remarks:

	The same of the sa		STATE OF THE PERSON NAMED IN					
Development Support Equipment			-				0.00	
Software Development							0.000	
Training Development							0.000	
Integrated Logistics Support							0000	
Configuration Management							0000	
Technical Data							0.00	
3 E							0.000	
Subtotal Support	0.000	0.000		0000	0.000	0.000	0.000	

Remarks:

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 4 of 5)

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R-1 SHOPPING LIST - Item No. 45-4 of 45-5

Enclosure (12)

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								DATE:				
Exhibit R-3 Cost Analysis (page 2)	(Z									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	۲	PROGRA	PROGRAM ELEMENT NAME AND NUMBER	VIE AND NUME	BER	PROJECT N.	PROJECT NAME AND NUMBER	BER				
RDT&E, N		Surface ASW/	ASW/PE 0603553N	3553N		ASW Advan	ASW Advanced Development/V1704	9nt/V1704				
Cost Categories C	1	Performing	Total		FY 99		FY 00		FY 01			
, or System/Item	Method	Activity &	PYs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost	Cost (K\$)	Date	Cost (K\$)	Date	Cost (K\$)	Date	Complete	Cost	of Contract
Developmental Test & Evaluation M	WR	NUWC/Npt		0.519	03/99	1.300	10/99	1.241	10/00	Continuous	Continuous	
1	WR	NAWC/Pax River		0.505	66/60	0.600	10/99	0.500	10/00	Continuous	Continuous	
1	CPFF	NBB				0.750	12/99	0.637	12/00	Continuous	Continuous	
ŀ	CPFF	Oasis				0.040	12/99	0.050	12/00	Continuous	Continuous	
	WR	NUWC/Keyport				1.000	10/99	1.000	10/00	Continuous	Continuous	
	WR	NSWC/Carderock, MD				0.250	10/99	0.211	10/00	Continuous	Continuous	
	WR	NSWC/Dahlgren, VA				0.249	10/99	0.200	10/00	Continuous	Continuous	
П	SS/CPFF	SS/CPFF APL/JHU, MD				2.000	12/99	2.000	12/99	Continuous	Continuous	
Г			0000	1.024		6.189		5.839		Continuous	Continuous	
Contractor Engineering Support											0.000	
동	1	Other Contract		0 406	77	0	42,000	24.0	12,00	andireitad	0.000	
т мападетел эпрроп	1	Stanley Assoc.	+	0.100	06/1	0.100	12/33	00.00	2007	COURINGORS	CONTINUOUS	
Travel				0.025		0.025		0.025		Continuous	Continuous	
Cabor (Research Fersonner)											0000	
Subtotal Management			0.000	0.211		0.125		0.125		Continuous	Continuous	
Remarks:												
Total Cost				4.839		6.948		6.752		Continuous	Continuous	
Remarks:												
												,,

R-1 SHOPPING LIST - Item No. 45-5 of 45-5

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 5 of 5)

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EXHIBIT R-2, RDT&E Budget	RDT&E Budo	let Item Jus	Item Justification				DATE:			
	•						i	Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE	AENCLATURE				
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	N, NAVY/BA-	4			SSGN 0603559N	N6				
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Total PE Cost		0.000	0.000	34.762	0.000	0.000	0.000	0.000	0.000	34.762
SSGN Trident Conversion/S2413		0.000	0.000	34.762	0.000	0.000	0.000	0.000	0.000	34.762
Quantity of RDT&E Articles										0.000

attack, SSGN submarines. The SSGN is envisioned to provide a robust and covert land attack strike and Special Operating Force (SOF) platform fully integrated into a joint battlespace with minimal external support. The goals of the platform design are to include the capability to launch in excess of 100 attack missiles (e.g. Tomahawk) in a single salvo, and over 60 SOF personnel and two Advanced Seal Delivery Systems or Dry Deck Shelters for periods up to 90 days. This capability would allow the SSGN to replace A. (U) Mission Description and Budget Item Justification: This program supports initial design efforts for the conversion of Ohio Class submarines to conventional, land two dedicated SOF submarines scheduled for inactivation, the USS James K. Polk and USS Kamehameha.

- (U) Program Accomplishments and Plans:
- 1. (U) FY 1999 Accomplishments:
- (U) FY 1999 feasibility studies were accomplished under PE 0603563N.
- (U) FY 2000 Plan:
- 2. (U) FY 2000 efforts are funded under PE0603563N (\$9.320M).

R-1 SHOPPING LIST - Item No. 46-1 of 46-6

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 6)

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APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	SGN 0603559N

3. (U) FY 2001 Plan

(U) (\$13.900) Conduct design activities for risk mitigation, alternative selection, and conversion planning.

(U) (\$15.400) Commence Attack Weapons Systems design and risk mitigation activities which will include: Missile Tube and Launcher/Canister design, test plan development, handling equipment development, and test program fabrication, hardware and software design for the Attack Weapons Systems Fire Control System and design

of navigation subsystems. (U) (\$5.462) Commence engineering studies and efforts for ship control, safety, hydrodynamics, test and evaluation, and required technical and milestone documentation.

B. (U) Program Change Summary:

	0.000	0.000	0.000 0.000 0.000	0.000
FY 2000 President's Budget:	Appropriated Value:	Adjustments to FY 1999/2000 Appropriated Value:	FY 2000 President's Budget:	FY 2001 President's Budget

(U) Change Summary Explanation:

(U) Funding: A new Program Element (0603559N) was established for the FY 2001 SSGN Trident Conversion design effort.

(U) Schedule: Not Applicable.

(U) Technical Change: Not Applicable.

R-1 SHOPPING LIST - Item No. 46-2 of 46-6

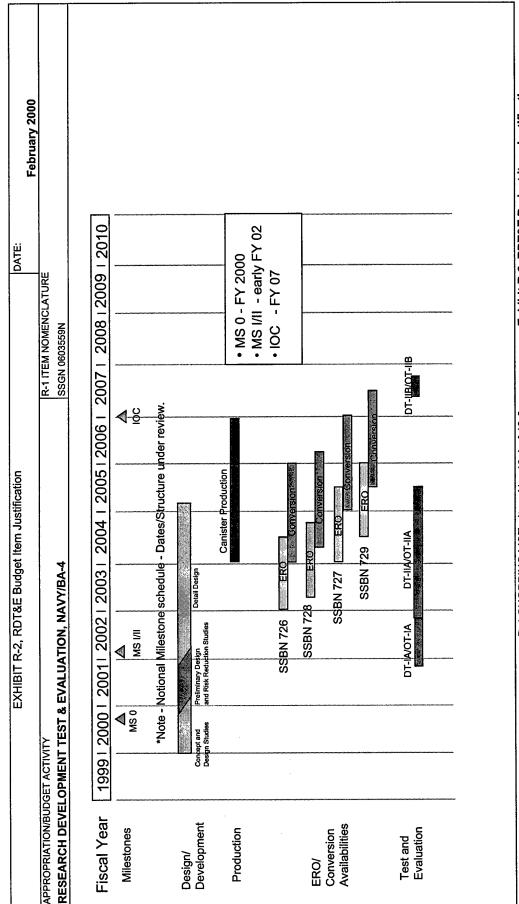
Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 2 of 6)

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EXHIBIT R-2, RDT&E Budget Item Justification	ndget Item Jus	tification			۵	DATE:	February 2000	y 2000	
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	3A-4		<u>α</u> <u>α</u>	R-1 ITEM NOMENCLATURE SSGN 0603559N	ENCLATURE N				
C. (U) Other Program Funding Summary:									
FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	To FY 2005 Complete	To Complete	Total Cost	
(U) 0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	0.000	
- (U) Related RDT&E:									
(U) PE 0603563N Ship Concept Advanced Design									
D. (U) Acquisition Strategy									
(U) To refuel, overhaul, convert and deliver four Trident Submarines into land attack strike and Special Operating Force platforms.	Submarines in	to land attac	k strike and	Special Ope	rating Force	platforms.			
E. (U) Schedule Profile:									
(U) See attached Planning Schedule.									

R-1 SHOPPING LIST - Item No. 46-3 of 46-6

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 3 of 6)



R-1 SHOPPING LIST - Item No. 46-4 of 46-6

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 4 of 6)

CLASSIFICATION:

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Exhibit R-3 Cost Analysis (page 1)	le 1)							DATE:		February 2000	001	
APPROPRIATION/BUDGET ACTIVITY	ΙΤΥ	PROGRAM ELEMENT	LEMENT			PROJECT N	PROJECT NAME AND NUMBER	MBER				
RDT&E, N/BA-4		SSGN 0603559N	29N									
Cost Categories	Contract	Ď.	Total		FY 99		FY 00		FY 01			;
(Tailor to WBS, or System/Item		-14	ΡΥs	6	Award	FY 88	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete		of Contract
Primary Hardware Development											0.000	
Ancillary Hardware Development											0.000	
Systems Engineering	SS/CPFF	SS/CPFF General Dynam Groton, CT	0.000	0.000		0000		10.412	Various	0.000	10.412	
Systems Engineering	WR/RC	WR/RC NSWC Carderock, MD	0.000	0.000		0.000		2.000	10/00	0.000	2.000	
Systems Engineering	WR	NUWC Newport, RI	0.000	0.000		0.000		1.976	Various	0.000	1.976	
AWS Risk Reduction	C/CPFF Various	Various	0.000	0.000		0000		7.800	10/00	0.000	7.800	
AWS Concept Exploration	WR/MIPR NAVAIR	NAVAIR	0.000	0.000		0000		2.250	10/00		2.250	
Systems Engineering	Varions	Varions	0.000	0.000		0.000		4.924	Various	0000	4.924	
Award Fees											0.000	
Subtotal Product Development			0.000	0.000		0.000		29.362		0.000	29:362	
Remarks:												
Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

R-1 SHOPPING LIST - Item No. 46-5 of 46-6

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 5 of 6)

UNCLASSIFIED

									DATE	[
Exhibit R-3 Cost Analysis (page 2)	te 2)										February 2000	0	
APPROPRIATION/BUDGET ACTIVITY	L L L		PROGRAM ELEMENT	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	WBER				
RDT&E, N/BA-4		İ	SSGN 0603559N	559N									
Cost Categories	Contract	Contract Performing		Total	2	FY 99	2	FY 00	2	FY 01	4	Total	Target Value
(Tailor to WBS, or System/Item Requirements)	& Type	Activity & Location		Cost	Cost	Date	Cost	Date	Cost	Date	te	Cost	of Contract
Developmental Test & Evaluation												0.000	
Developmental Test & Evaluation												0.000	
Developmental Test & Evaluation												0.000	
Operational Test & Evaluation												0.000	
Tooling												0.000	
GFE												0.000	
Subtotal T&E				0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:													ALV.
Contractor Engineering Support												0.000	
Government Engineering Support												0.000	
Program Management Support & ET Various	П	Varions		0.000	0.000		0.000		5.400	Various	0.000	5400.000	
Travel	T-1											0.000	
Labor (Research Personnel)												0.000	
Overhead												0.000	
Subtotal Management				0.000	0.000		0.000		5.400		0.000	5.400	
Remarks:													
Total Cost				0.000	0.000		0.000		34.762		0.000	34.762	
Remarks:													
				1									

R-1 SHOPPING LIST - Item No. 46-6 of 46-6

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 6 of 6)

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EXHIBIT R-2, RDT&E Budget Item Justification	&E Budget Item J	ustification				DATE:	1		
							Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NO	R-1 ITEM NOMENCLATURE				
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	AVY/BA-4			Advanced Su	Advanced Submarine Systems Development/0603561N	ns Developmer	nt/0603561N		
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	116,245	124.051	113.269	121.064	118.988	124.926	117.464	0.000	719.762
Adv. Sub. Systems Development/S2033	57.075	43.898	46.084	54.774	54.906	58.891	59.397	CONT.	CONT.
Enhanced Performance Metal Brush/S2756	0.000	2.287	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Adv. Sub. Combt Svs. Dev/V0223	59,170	69.911	67.185	66.290	64.082	66.035	58.067	CONT.	CONT.
Conf Array Vel Sensor/V2753	0.000	2.983	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Common Towed Array Prog/V2754	0.000	1.989	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Afford Adv Acoustic Arrays/V2755	0.000	2.983	0.000	0.000	0.000	0.000	0.000	0.000	0.000

A. (U) Mission Description and Budget Item Justification: A Comparability Adjustment by Issue #64088 for this RDT&E Budget line and NAVSEA restructure by Issue #66765 to transfer all the RDT&E funds from PE 0603504N/V0223, V2389 Advanced Submarine Combat Systems Development into PE 0603561N under Project V0223 for FY2000 and out. Each page will cite which Project Unit is being described. (U) This program supports innovative research and development in submarine technologies and the subsequent evaluation, demonstration, and validation for submarine platforms. It will increase the submarine technology base and provide subsystem design options not currently feasible.

under this program have potential for backfit into existing classes of submarines, supporting emerging requirements, and systems technology insertion into future submarine non-acoustic signature reduction, remote vehicle R&D, and large scale hydrodynamic experimentation; operates the Hydrodynamic/Hydroacoustic Technology Center to (U) Project Unit S2033: The Advanced Submarine Research & Development Office identifies the most promising and emerging technologies for VIRGINIA Class Submarine and other submarine platform insertion and transitions them into specific demonstration/validation efforts. The program element is non-ACAT and transitions technologies developed by Navy technology bases, the private sector, and the Defense Advanced Research Projects Agency Tactical Technology Office. Advanced systems developed designs. Research and development investment factors used to select these technologies include: economic environment and return on investment; mission enhancement; and safety and survivability. The program office also supports two Information Exchange Programs with the United Kingdom, (one on submarine electromagnetic silencing and the second on submarine platform equipment, systems, and hull technology); operates the Large Scale Vehicle to provide at-sea test capability for propulsor, acoustic and enhance the Navy's ability to accurately, computationally predict hydrodynamic and hydroacoustic performance of submerged bodies; operates and supports

R-1 SHOPPING LIST - Item No. 47

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 18)

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EXHIBIT R-2, RDT&E Budget Item Justification	DATE: February 2000
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	Advanced Submarine Systems Development/0603561N

the Intermediate Scale Measurement System; and provides life cycle support for the R&D Submarine modifications. In addition, the program is designing and constructing a second large scale vehicle, LSV2.

(U) Project S2756 is authorized by Congress under Committee Report - Senate Rpt. 106-50 - for Advanced Metal Fiber Brush Technology. Metal Fiber electric motor brushes have the potential to significantly improve shipboard quality of life, reduce total ownership costs of ships and increase the survivability and operational reliability of electric This Program has been structured to support near term VIRGINIA Class insertion as well as core technologies in Hydrodynamics/Hydroacoustics, Affordability, and Stealth. motors and generators (U) Project Unit V0223: This non-acquisition (Non-ACAT) program supports the Navy Submarine Acoustic Superiority and Technology Insertion Initiatives through the deterrence, regional sea denial, precision strike, task group support, and ground warfare support. Prototype hardware and/or software systems are developed to demonstrate application of advanced development and testing of improvements to present and future sonar and combat control systems. The goal is to address the technology challenges technologically promising system concepts in Laboratory and at-sea submarine environments. Technology areas specific to this program include transducers, hull-mounted and towed arrays, on-board monostatic and bistatic sonar signal processing, target motion analysis (TMA), multiple contact processing and test and evaluation. This program that marginalize tactical control in littoral and open ocean environments during the performance of a variety of missions including peacetime engagement, surveillance, is funded under demonstration and validation because it develops and integrates hardware for experimental test related to specific ship and aircraft applications.

(U) Projects V2753, V2754, and V2755 are authorized by Congress to pursue the application of fiber optic technology in submarine acoustic array systems as potential cost and performance improvements to future operational sonar array systems.

FY 2001 114 926		-1,657	113,269
FY 2000	126,067	-2,016	124,051
FY 1999 60 520	60,520	55,725	116,245
B. (U) Program Change Summary:	Pri 2000 Freshein s Dauget. Appropriated Value:	Adjustment to FY 1999 Appropriated Value/	FY2000 President's Budget FY2001 PRES Budget Submit

R-1 SHOPPING LIST - Item No. 47

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 2 of 18)

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification	February 2000	F ACTIVITY R-1 ITEM NOMENCLATURE	RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	
Ш		APPROPRIATION/BUDGET ACTIVITY	RESEARCH DEVELOPMENT TEST & I	

(U) Change Summary Explanation:

(U) FY 2000 Total Program Funding: \$2.005M of the extramural program is reserved for SBIR assessment IAW 15 USC 638.

(U)S2033 Funding: The FY99 decrease of (-\$3,445M) is attributed to Undistributed Adjustments (-\$.199K), Small Business Innovative Research (-\$1,129M). RDTEN Jun Btr Update (-\$500K) and FY99 Midyear Review Btr's (-\$1,181), (-\$274K) for Inflation Savings, (-\$152K) BS 1002 Actual Update and (-\$10K) for FY99 BTR

The FY 2000 increase of (\$.57K) is attributed to restore issue 62288 outsourcing and a decrease of (-\$51K) for SSP (Contracts), also received (-\$243K) across the board

FY 2001 decrease attributed to Advanced Submarine Technology (-\$12,200K) and an increase of (\$11,739) for the Buyback of same Technology, increase to Restore issue 62288 Outsourcing (\$.371K), SSP Contracts decrease of (-\$160K), NWCF increase of (\$.101K), SSP - NUWC Functionality Assessment decrease (-\$2K) and SSP -NUWC Contract Efficiencies decrease (-\$7K). (\$77) increase from PBD 411, (\$16K) decrease from PBD 606 Military/Civilian pay rates, (-\$315K) from PBD 604 Nonpay r Purchase Inflation and (-\$121K) decrease from PBD 0222C2 Active Navy Ops.

(U)S2756 Funding: The FY00 decrease of (-\$.13K) is due to an Across-the-Board Reduction

(U)V0223 Funding: The FY99 increase of (\$59,718) is for a Comparability adjustment and decreases of (-\$.538K) for BSO 1002 Update and (-.\$10K) for a FY99 BTR. The FY2000 decrease of (\$-1,333K) attributed to Advanced Undersea Warfare adjustments and an Across-the-Board Reductions of (-\$.388K). The FY 2001 Advanced Sub Technology reduction (-\$13,740K) and buyback (\$13,740K), NWCF Rate increase of (\$.852K), SSP - NUWC Functionality Assessment decrease of (-\$52K), SSP - NUWC Contract Efficiencies decrease (-\$168K) and a Advanced Undersea Warfare decrease of (-\$1,270K), increase of (\$.83K) for PBD 411 adjustments, increase of (\$.35K) for Mil/Civ Pay Rates, decrease of (-\$.459K) for Nonpay Purchase Inflation and a reduction of (-\$.177K) for Active Navy Ops.

(U)V2754 Funding: The FY00 decrease of (-\$.11K) is due to an Across-the-Board Reduction. (U)V2755 Funding: The FY00 decrease of (-\$.17K) is due to an Across-the-Board Reduction. (U)V2753 Funding: The FY00 decrease of (-\$17K) is due to an Across-the Board Reduction.

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Exhibit R-2, RDT&E Budget Item Justification

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UNCLASSIFIED

DATE: February 2000	R-1 ITEM NOMENCLATURE Advanced Submarine Systems Development/0603561N	as identified in Secretary of Defense Report on Nuclear Attack Submarine Procurement and Submarine.	
EXHIBIT R-2, RDT&E Budget Item Justification	APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	(U) Schedule: Not Applicable. (U) Technical: Proceed with the Category II Core Technologies as identified in Secretary of De	

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Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 4 of 18)

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	ification				DATE:		Eohman, 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4	PROGRAM EL Advanced S	PROGRAM ELEMENT NAME AND NUMBER Advanced Submarine Dev/0603561N	AND NUMBE 0ev/0603561	<u>د</u> <u>ح</u>	PROJECT NA Advanced Sub	PROJECT NAME AND NUMBER Advanced Submarine Systems De	BER s Development	1 - S2033/Adv.	PROJECT NAME AND NUMBER Advanced Submarine Systems Development - S2033/Adv. Metal Fiber Brushes - S2756	- \$2756
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Adv. Submarine Systems Dev S2033		57.075	43.898	46.084	54.774	54.906	58.891	59.397	CONT.	CONT.
Adv. Metal Fiber Brushes - S2756		0.000	2.287	0.00	0.000	0.000	0.00	0.000	COMP.	COMP.

A. (U) Mission Description and Budget Item Justification: This program supports innovative research and development in submarine technologies and the subsequent evaluation, demonstration, and validation for submarine platforms. It will increase the submarine technology base and provide subsystem design options not currently feasible (U) Project Unit S2033: The Advanced Submarine Research & Development Office identifies the most promising and emerging technologies for the VIRGINIA Class Submarine and other submarine platform insertion and transitions them into specific demonstration/validation efforts. The program element is non-ACAT and transitions technologies developed by Navy technology bases, the private sector, and the Defense Advanced Research Projects Agency Tactical Technology Office. Advanced systems developed under this program have potential for backfit into existing classes of submarines, supporting emerging requirements, and systems technology insertion into future submarine designs. Research and development investment factors used to select these technologies include: economic environment and return on investment; mission enhancement; and safety and survivability. The program office also supports two Information Exchange Programs with the United Kingdom, (one on submarine capability for propulsor, acoustic and non-acoustic signature reduction, remote vehicle R&D, and large scale hydrodynamic experimentation; operates the electromagnetic silencing and the second on submarine platform equipment, systems, and hull technology); operates the Large Scale Vehicle (LSV) to provide at-sea test Hydrodynamic/Hydroacoustic Technology Center to enhance the Navy's ability to accurately, computationally predict hydrodynamic and hydroacoustic performance of submerged bodies; operates and supports the Intermediate Scale Measurement System; and provides life cycle support for the R&D Submarine modifications. In addition, the program is designing and constructing a second large scale vehicle, LSV2.

U) Project S2756 is authorized by Congress under Committee Report - Senate Rpt. 106-50 - for Advanced Metal Fiber Brush Technology. Metal Fiber electric motor brushes have the potential to significantly improve shipboard quality of life, reduce total ownership costs of ships and increase the survivability and operational reliability of electric motors and generators.

(U) This Program has been structured to support near term Virginia Class insertion as well as core technologies in Hydrodynamics/Hydroacoustics, Affordability, and Stealth.

R-1 SHOPPING LIST - Item No. 47

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 5 of 18)

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EXHI	EXHIBIT R-2a, RDT&E Project Justification	DATE
		February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	Advanced Submarine Sys Dev/0603561N	Advanced Submarine Systems Development - S2033/Adv. Metal Fiber Brushes - S2756

- (U) Program Accomplishments and Plans:
- 1. (U) FY 1999 Accomplishments:
- (U) (\$7.924M) Stealth: Continued development of advanced submarine propulsor technologies, internal transmission paths, hull radiation and echo formation (Advanced Coating), Advanced EM Silencing, Signature Characterization and Master Plan development.
 - improve hydrodynamic performance of submarines through modification of flow and lift characteristics (Powering & Resistance). Completed 1/16 scale evaluation of the Advanced Sail in the LCC. Completed construction of 1/4 scale Advanced Sail for LSV. Developed the Advanced Sail. Initiated transition of NASA's virtual wind tunnel to (U) (\$8.842M) Hydrodynamics/Hydroacoustics: Continued development of elements of Integrated Computational Design Environment analysis of hydrodynamic and hydroacoustic submarine performance (Maneuvering and Control). Continued Rim Driven Thruster/MSW pump development. Developed and demonstrated techniques to development of a virtual water tunnel. Initiating of SSM Master Plan.
- (U) (\$28.609M) Infrastructure: Continued operations and support for the Large Scale Vehicle (LSV), Hydroacoustic/Hydrodynamic Test Center (H/HTC), Intermediate Scale Measurement System (ISMS), R&D submarine. Continued design and construction of (LSV 2).
 - (U) (\$4.212M) Total Ownership Cost/Affordability: Continued research and development of Elastomeric EjectionSystem for insertion into the Virginia Class.
- (U) (\$7.488M) Initiated study for Payloads in compliance with Defense Science Board Report recommendations. Mission and Future Design (M&FD)/Hull, Mechanical & Electrical (H, M & E) Conform Studies. New Technology Assessment support, Technical Architecture support, N87 SAIC study.

\$57.075M TOTAL

- 2. (U) FY 2000 Plan:
- (U) (\$6.917M) Stealth: Continue development of advanced submarine propulsor technologies, internal transmission paths, Advanced Electromagnetic Silencing, hull radiation and echo formation (Advanced Coatings), and signature characterization.
 - (U) (\$13.324M) Hydrodynamics/Hydroacoustics: Continue development of elements of Integrated Computational Design Environment analysis of hydrodynamic and hydroacoustic submarine performance (Maneuvering and Control). Develop and demonstrate techniques to improve hyrodynamic performance of submarines through modification of flow and lift characteristics (Powering and Resistance). Complete demonstration/validation of the Advanced Sail on LSV. Continue Rim Driven Thruster/Main Seawater Pump development.

R-1 SHOPPING LIST - Item No. 47

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 6 of 18)

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	DATE:
		February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	Advanced Submarine Sys Dev/0603561N	Advanced Submarine Systems Development - S2033/Adv. Metal Fiber Brushes - S2756

- (U) (\$15.411M) Infrastructure: Continue operations and support for the Large Scale Vehicle, H/HTC, ISMS, R&D submarine. Continued design and construction of
- (U) (\$5.948M) Total Ownership Cost/Affordability: Complete demonstration/validation of EES and transition to Virginia Class PE. Initiate Peel and Stick Damping study, initiate design and testing of Advanced Metal Fiber Brushes technology (\$2.3M additional funding under Project Unit S2756).
 - (U) (\$2.292M) Continue Mission and Future Design (M&FD)/Hull, Mechanical and Electrical (HM&E) Conform Studies and New Technology Assessment support.
 - (U) (\$.006) Outsourcing restructuring
 - \$43.898M TOTAL
- 3. (U) FY 2001 Plan:
- (U) (\$18.385M) Steatth: Continue development of corporate Electric Drive, advanced submarine propulsor technologies, internal transmission paths, Advanced Electromagnetic Silencing, and signature characterization. Initiate flow noise reduction project.
- (U) (\$5.745M) Hydrodynamics/Hydroacoustics: Continue development of elements of Integrated Computational Design Environment analysis of hydrodynamic and hydroacoustic submarine performance (Maneuvering and Control). Develop and demonstrate techniques to improve hydrodynamic performance of submarines through modification of flow and lift characteristics (Powering and Resistance). Complete Rim Driven Thruster/Main Seawater pump development. Complete Advanced Sail development
- (U) (\$16.273M) Infrastructure: Continue operations and support for the Large Scale Vehicle, Hydroacoustic/Hydrodynamic Test Center(H/HTC), Intermediate Scale Measurement System (ISMS), R&D Submarine. Complete design and construction of the LSV 2. Initiate acceptance trials.
- (U) (\$2.782M) Recontinue study for Payloads in compliance with Defense Science Board Report recommendations. Continue M&FD/HM&E Conform Studies and New - (U) (\$2.899M) Total Ownership/Affordability: Complete demonstration and validation of Elastomeric Ejection System for insertion into the Virginia Class. Continue development of Advanced Metal Fiber Brushes. Technology Assessment support.

\$46.084M TOTAL

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 7 of 18)

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	EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4		PROGRAM ELEMENT NAME AND NUMBER Advanced Submarine Sys Dev/0603561N	561N	PROJECT NAME AND NUMBER Advanced Submarine Systems Development - S2033/Adv. Metal Fiber Brushes - S2756
B. (U) Other Program Funding S	ummary: additi	onal \$50M of SEALIFT National Defens	e Funds was appropriated in FY97, ¿	B. (U) Other Program Funding Summary: additional \$50M of SEALIFT National Defense Funds was appropriated in FY97, authorized in FY98 for LSV development.
(U) Related RDT&E: Not applicable.	icable.			
C. (U) Acquisition Strategy: Not applicable.	applicable.			
D. (U) Schedule Profile:				
PY 1998 PROGRAM Complete Advanced Submarine MILESTONES Propulion System concepts. Conduct LSV propulsor festing	FY 1998 ranced Submarine item concepts. propulsor festing	FY 1999 Advanced coating effort deferred to FY02. Advanced decks & mounts effort restructured	FY 2000 Complete demonstration/validation of advanced sail on LSV, transition to VIRGINIA class PE. Hydroacoustic/Hydrodynamic Test	FY 2001 Initial operating capability of LSV 2 Complete Rim Driven Thruster/main seawater pump development
for VIRGINIA propulsor development/improvem	for VIRGINIA propulsor development/improvement program		Center computer refresh upgrade Acoustic Research Detachment Range	
ENGINEERING Complete EES 1st generation MILESTONES elastomeric disk life cycle test	st generation life cycle test	Closeout and final documentation for development of enabling components and analytical techniques needed for	Projection of LSV 2 modules Assemble LSV 2 modules Assemble LSV 2 modules at Lake Pend Oreille	LSV 2 acceptance and characterization trials Initiate electric drive development
Design and fab prototype Adv. Sail & test instrumentation	prototype Adv. mentation	electric drive Complete design of advanced mount	Initiate advanced truss/deck design, continue shock mount testing, test air mount design	Complete upgrade/replace LSV range acoustic array
Complete man plass or over a opment of enabling component and analytical techniques need for main propulsion electric driv	Complete final phase of devolutions of the part of enabling component and analytical techniques needed for main propulsion electric drives	Completed fabrication of 1/4 scale Advanced Sail for LSV evaluation	Initiate prototype design of flow management install replacement battery in LSV 1	
Complete concept design for Large Scale Vehicle 2 (LSV 2)	pt design for nicle 2 (LSV 2)		Begin upgrade/replace LSV range acoustic array Complete 2nd design option for LSV 2 coating	

R-1 SHOPPING LIST - Item No. 47

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 8 of 18)

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	EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2000
APPROPRIATION/BUDGET ACTIVITY BDT8 E N/BA 4	OGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	EG4N	PROJECT NAME AND NUMBER Advanced Submotion Sustant Development 20032/Adv Motel Eller Brushes C2758
NUIGE, N/DA-4		Advanced Subming bys Devicedon		Is Developine in - 32033/Auv. Metal Fiber Brushes - 32730
_	FY 1998	FY 1999	FY 2000	FY 2001
ENGINEERING	Deliver full length composite shaft		Complete development of Stealth Master Plan	an
	Completed 1st design option for Large Scale Vehicle 2 (LSV 2) coating	ating	Concept for LSV evaluation	
T&E MILESTONES	Conduct SAS Sea Test II	Completed evaluation of 1/16 Advanced Sail in LCC	Complete EES 2nd generation disk life cycle aging test	
		Begin testing of 2nd gen. Elastomeric Disk Conduct hydroacoustic evaluation of for life cycle and aging Advanced Sail prototype on LSV 1	Conduct hydroacoustic evaluation of Advanced Sail prototype on LSV 1	
		Conduct pass/fail test of flow mgmt. concepts	Weapons effect testing of advanced decks and mounts	
			Begin EES EDM equipment testing	
CONTRACT MILESTONES		Award LSV 2 detailed design/ build contract		
		Award concept formulation contract		
		Award Virtual Water Tunnel contract		

R-1 SHOPPING LIST - Item No. 47

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 9 of 18)

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									DATE:				
Exhibit R-3 Cost Analysis (page 1)	ge 1)										February 2000	000	
APPROPRIATION/BUDGET ACTIVITY	VITY		PROGRAM ELEMENT	EMENT			PROJECT NA	PROJECT NAME AND NUMBER	1BER				
RDT&E, N/BA-4		7	Advanced Submarine		Sys Dev/0603561N	303561N	Advanced Su	Advanced Submarine Systems Development/S2033	ms Developme	9nt/S2033			
Cost Categories	Contract	Contract Performing		Total		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Method Activity &		ΡΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	& Type Location	<u>y</u>	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Systems Engineering	S/CPFF	S/CPFF NNS Newport News, VA	lews, VA	40.420	1.781	12/98	4.700	05/00	8.000	12/00	24.200	79.101	67.800
Systems Engineering	S/CPIF	NNS Newport News, VA	lews, VA	0.000	11.267	02/99	4.091	05/00	2.200	12/00	59.200	76.758	80.000
Systems Engineering	S/CPFF	S/CPFF EB Groton, CT		43.900	3.976	12/98	0.707	05/00	4.500	12/00	CONT.	CONT.	37.300
Systems Engineering	WR	NSWC Bethesda, MD	la, MD	112.190	22.825	10/98	18.600	10/99	17.600		CONT.	CONT.	
Systems Engineering	S/CPFF	ARL/PSU, State College,PA	College,PA	30.100	1.624		1.600	01/00	3.000	12/00	CONT.	CONT.	
Systems Engineering	WR	NUWC Newport, RI	2	66.500	3.128	10/98	0.900	10/99	0.800		CONT.	CONT.	
Systems Engineering	S/CPFF	KAPL Schenectady, NY	dy, NY	0.000	2.000	03/99	3.300				CONT.	CONT.	
Systems Engineering		Cortana			1.400		1.400		3.324		CONT.	CONT.	
Subtotal Product Development				293.110	48.001		35.298		39.424				
Remarks:													
EB's PY cost is greater than total value of contract due to a new contract award.	value of co	ntract due to a ne	ew contract aw	ard.									
	-											0000	

Development Support Equipment								0.000	
Software Development								0.000	
Training Development								0.000	
Integrated Logistics Support								0.000	
Configuration Management								0.000	
Technical Data								0.000	
GFE								0.000	
Subtotal Support	La constitución de la constituci	0.000	0.000	0.000	0	0.000	0000	0.000	

Remarks: Not applicable.

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Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 10 of 18)

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								DATE:				
Exhibit R-3 Cost Analysis (page 2)	3)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	<u></u>	PROGRAM ELEMENT	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	ABER				
RDT&E, N/BA-4		Advanced	Advanced Submarine	Sys Dev/0603561N	303561N	Advanced Su	Advanced Submarine Systems Development/S2033	ms Developme	ent/S2033			
	Contract	Contract Performing	Total		FY 99		FY 00		FY 01			
or System/Item		Activity &	PYs	o	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
- 1	_	Location	Cost		Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Test & Evaluation	WR	NSWC Bethesda, MD	16.634	1.042	10/98	3.000	10/99	3.853	•	CONT.	CONT.	
		NNS Norfolk, VA	0.000	1.817	12/98	3.000	05/00	2.000	12/00	66.800	73.617	67.800
		EB Groton, CT	15.901	1.805	12/98	1.000	05/00	0.807	12/00	21.000	40.513	37.300
l	S/CPFF	DARPA Fairfax, VA	0.000	3.000	05/99	0.000		0.000		0.000	3.000	3.000
	1	NOESIS	0.200	1.000	66/80	0.700		0.000		0.000	1.900	1.200
	S/CPFF	VdS		0.410	02/39	0.900		0.000		0.000	1.310	0.600
Subtotal T&E			32.535	9.074		8.600		099'9				
Remarks:												
Contractor Engineering Support	S/CPFF	NNS Norfolk, VA	1.700								1.700	
		EB Groton, CT	1.700								1.700	
											0.000	
Government Engineering Support	WR	NSWC Bethesda, MD	1.000								CONT.	
											0000	
											0.000	
Subtotal Management			4.400	0.000		0.000		0.000		0.000	4.400	
Remarks:												
Total Cost			330.045	57.075		43.898		46.084				
Remarks:												
			R-1 SHOF	DPPING LIST - Item No.	- Item No.	47						

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 11 of 18)

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	tification				DATE:			
								Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	EMENT NAME	AND NUMBE	Α.	PROJECT NA	PROJECT NAME AND NUMBER	BER			
RDT&E, N/BA-4	Advanced Submarine Dev/0603561N	Submarine [Jev/0603561	Z	Advanced Sub	marine Comba	Advanced Submarine Combat Systems Development/V0223	elopment/V02;	23	
COST (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost	0.000	59.170	69.911	67.185	66.290	64.082	66.035	58.067	CONT.	CONT.
RDT&E Articles Qtv										

A. (U) Mission Description and Budget Item Justification: This program supports innovative research and development in submarine technologies and the subsequent evaluation, demonstration, and validation for submarine platforms. It will increase the submarine technology base and provide subsystem design options not currently feasible.

(U) Project Unit V0223: This non-acquisition (Non-ACAT) program supports the Navy Submarine Acoustic Superiority and Technology Insertion Initiatives through the application of advanced development and testing of improvements to present and future sonar and combat control systems. The goal is to address the technology challenges deterrence, regional sea denial, precision strike, task group support, and ground warfare support. Prototype hardware and/or software systems are developed to demonstrate technologically promising system concepts in Laboratory and at-sea submarine environments. Technology areas specific to this program include transducers, hull-mounted and towed arrays, on-board monostatic and bistatic sonar signal processing, target motion analysis (TMA), multiple contact processing and test and evaluation. This program that marginalize tactical control in littoral and open ocean environments during the performance of a variety of missions including peacetime engagement, surveillance, is funded under demonstration and validation because it develops and integrates hardware for experimental test related to specific ship and aircraft applications.

(U) Program Accomplishments and Plans:

FY 2000 Plan (V0223):

(\$7.200) Advanced Tactical Control - Begin development of Tactical Control Build 2 software. Further define functional priorities and initiate development of 3D tactical scene rendering, improved use of ARCI data and integrated vulnerability information management. Conduct at-sea evaluation. Develop performance quantification metrics and data collection, storage and analysis methodologies.. Develop and deliver SFMPL 6.2. Identify potential information management solutions including cooperative Common Teactical Decisions Aids from DARPA, ONR, industry and academia. Evaluate for inclusion in Tactical Control Builds.

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(Exhibit R-2a, page 12 of 18 Exhibit R-2a, RDT&E Project Justification

UNCLASSIFIED

RDT&E, N/BA-4 PROGRAM ELEMENT NAME AND NUMBER PROJECT RDT&E, N/BA-4 Advanced Submarine Dev/0603561N Advance COST (\$ in Millions) FY 1998 FY 1999 FY 2000 FY 2001 FY 2001			DATE:			
UDGET ACTIVITY PROGRAM ELEMENT NAME AND NUMBER Advanced Submarine Dev/0603561N OST (\$ in Millions) FY 1998 FY 1999 FY 2000 FY 2001 0.000 59.718 70.299 67.848				Febru	February 2000	
Advanced Submarine Dev/0603561N OST (\$ in Millions) FY 1998 FY 1999 FY 2000 FY 2001 0.000 59.718 70.299 67.848		PROJECT NAME AND NUMBER	ER			
COST (\$ in Millions) FY 1998 FY 1999 FY 2000 FY 2001 0.000 59.718 70.299 67.848		Advanced Submarine Combat Systems Development/V0223	Systems Devel	opment/V022;	e	
0.000 59.718 70.299 67,848	FY 2001	2 FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
0.000 59.718 70.299 67.848					200	1000
	+	3 64.839	66.972	59.066	CONT.	CONT.
RDT&E Articles Qty						

- (\$35.204) Advanced Sonar System and Processing Complete APB 99 sea test and transition to ARCI Phase III. Complete development and integration, conduct MF and HF, continued automation enhancements, matched field localization, passive torpedo alertment, extension of 3-line MLTA processing, defensive multi-static, signal processing extensions for beamformerless detection, improved OMI, and environmental sensors.
- (\$7.107) Advanced Towed Arrays Continue 3-line array development. Complete fabrication of 1-line array. Develop NTMLTA signal processing design. Conduct 1-line lake test and Critical Item Tests. Complete 3-line ADM design. Conduct 3-line ADM CDR.
 - (\$11.800) Advanced Hull Arrays Continue development of CAVES technology. Perform analysis on CAVES pre-patch test data. Install CAVES Patch arrays on USS San Juan. Conduct Post-patch SRA Sea Test. Investigate current coatings CAVES performance. Continue planning for integration of CAVES technology with other Hull Initiate CACTISS III test planning. Initiate CAVES WAA transition planning. Initiate conformal array technology in conjunction with Advanced Sail to maintain current arrays. Perform CAVES Outer decoupler buckling experiment. Continue documentation of CAVES program. Investigate impact of outer decoupler on inner decoupler. capability. Initiate Integrated Bow Conformal Array technology to replace spherical array, HF sail array, and HF chin array. Extend Noise Audit Model for Integrated Conformal Array. Initiate planning for FY04 Lake Test/Demonstration and FY05 Sea Test/Demonstration. Design Bow Dome for demonstration tests. Initiate sensor development. Initiate acoustic source development. Initiate processor software development.
- (\$8.100) High Frequency Sonar Program Complete development, evaluation and testing of Build 2+ build and transition and integration into ARCI program. Complete Test bed upgrades. Initiate integration of ACOMMS processing and hardware into HF suite. Continue sail and conformal array studies. Continue processing improvements for HF APB 01 including bottom and target mapping, ASW improvements, bottom tracking and navigation, and adaptive signal design. Initiate processing improvements to support LMRS precision mapping efforts.
 - (\$.500) Test and Evaluation Conduct Towed Array APB lake test. Continue at-sea data gathering program. Initiate planning for HF APB Sea Test. \$69.911 TOTAL
- 2. (U) FY 2001 Plan:
- (\$7.037) Advanced Tactical Control Complete Tactical Control Build 2. Incorporate upgrades based on at-sea evaluation and deliver to CCS MK 2 and NSSN for integration. Conduct combat system performance assessment based on the defined metrics. Evaluate candidate technologies for Tactical Control Build 3. Conduct at-sea evaluation. Develop, test and deliver SFMPL update.

R-1 SHOPPING LIST - Item No. 47

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2, page 13 of 18)

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	ification				DATE:			
								Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	EMENT NAME	AND NUMBE	2	PROJECT NA	PROJECT NAME AND NUMBER	BER			
RDT&E, N/BA-4	Advanced S	Advanced Submarine Dev/0603561N	ev/0603561	Z	Advanced Sub	marine Comba	Advanced Submarine Combat Systems Development/V0223	elopment/V02	23	
COST (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost	0.000	59.170	69.911	67.185	66.290	64.082	66.035	58.067	CONT.	CONT.
RDT&E Articles Qty										

- (\$40.848) Advanced Sonar System and Processing Complete development, integration, conduct performance assessment and initiate transition of APB 01 to BQQ-10 project and NSSN. Initiate APB 02 including offensive multistatics enhancements, multi-mode low frequency, continued automation enhancements, extend processing large hull arrays.
 - (\$4.500) Advanced Towed Arrays- Continue 3-line array development. Conduct subsystem CITs. Fabricate 3-line array ADM. Fabricate 3-line signal processor ADM. Conduct system integration & testing
- (\$9.000) Advanced Hull Arrays- Continue CAVES technology development. Conduct CACTISS III test. Perform data analysis of CAVES Post-SRA Sea Test. Complete update of noise audit model. Initiate planning of CAVES Patch Array Sea Test II. Continue documentation of CAVES program. Continue CAVES WAA transition planning. Continue development of conformal array technology. Continue development of Integrated Conformal Array technology. Complete Noise Audit Model for Integrated Bow Conformal Array. Complete Bow Dome Design. Construct Bow Dome and mold inner decoupler. Construct acoustic sources and sensors, test and evaluate. Continue processor software development. Continue planning for demonstration tests.
 - (\$5.300) High Frequency Sonar Program- Continue processing improvements, evaluation and testing of HF APB01 initiatives. Continue ACCOMMS integration. Finalize study results. Transition on-going processing developments to advance processing. Continue processing improvements associated with LMRS precision mapping efforts.
 - (\$.500) Test & Evaluation conduct TCP sea tests, HF sea tests, MLTA demonstration and hull array testing. \$67,185 TOTAL
- B. (U) Other Program Funding Summary: Not applicable.
- (U) Related RDT&E: Not applicable.
- C. (U) Acquisition Strategy: Plan to use competitively awarded contracts from Board Agency Announcement (BAA) solicitations.

R-1 SHOPPING LIST - Item No. 47

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, pages 14 of 18

UNCLASSIFIED

	EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	tification				DATE:	Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY		PROGRAM EL	EMENT NAME	PROGRAM ELEMENT NAME AND NUMBER	۳.	PROJECT NA	PROJECT NAME AND NUMBER	ER			
RDI&E, N/BA-4		Advanced :	Submarine L	Advanced Submarine Dev/0603561N	z	Advanced Sub	Advanced Submarine Combat Systems Development/V0223	Systems Deve	slopment/V022	23	
COST (\$ in Millions)		FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost		0.000	59.170	69.911	67.185	66.290	64.082	66.035	58.067	CONT.	CONT.
RDT&E Articles Qty											
D. (U) Schedule Profile:	FY 1999	(PE0603504N)	04N)		FY 2000	21		FY 2001	되		
Program Milestones	2Q - Deliv Search 3Q - Tr 4Q - Tr	2Q - Delivered Range Dependent Search Capability to SFMPL 3Q - Transition TA-APB 99 to ARCI 4Q - Transition TCP BId 1	Dependent S SFMPL APB 99 to Al	KCI	2Q - SFN 3Q - 3 3Q - 1 APBS	2Q - SFMPL 6.2 Complete 3Q - Complete TCP APB-2 3Q - Transition TA-APB00 & HF APB99 to ARCI	olete p. APB-2 -APB00 & HF	3Q - CAVE	S WAA Trai	3Q - CAVES WAA Transition Decision	
Engineering Milestones	10 - Initiat 10 - In 20 - M 30 - D	1Q - Initiate TA-APB00 1Q - Initiate TCP APB-2 2Q - MLTA 1-line CDR 2Q - Complete TSOA 3Q - Deliver TCP BId 1			10 - Inii 10 - 40 -	1Q - Initiate TA-APB01 1Q - Deliver SFMPL 6.1 4Q - MLTA 3-line CDR	01 PL 6.1 CDR	1Q - Init 1Q - 3Q - 4Q	1Q - Initiate TCP APB -3 1Q - Initiate TA-APB01 3Q - MLTA System Integra 4Q - Deliver TCP APB-2	- Initiate TCP APB -3 1Q - Initiate TA-APB01 3Q - MLTA System Integration 4Q - Deliver TCP APB-2	
Test & Evaluation Milestones	30 - CACT 30 - T. 40 - C.	3Q - CACTISS II Test 3Q - TA-APB99 Sea Test 4Q - CAVES Pre-Patch T	a Test atch Test		30 - H 30 - 30 - 30 - 30 -	3Q - HF APB99 Sea Test 3Q - TA APB00 Sea Test 3Q - TCP APB 1 Sea Test 3Q - MLTA Self Noise Test	Test sea Test Sea Test If Noise Test	30 - TCF 30 - 30 - t 40	3Q - TCP APB-2 Sea Test 3Q - CACTISS III test 3Q - HF APB01 Sea Test 4Q - MLTA RV Sea Test	a Test II test iea Test Sea Test	

R-1 SHOPPING LIST - Item No. 47

Exhibit R-2a, RDT&E Project Justification (Exhibit R2a, page 15 of 18

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Part Part	Exhibit R-3 Cost Analysis (pa												
Contract Processors Proce		ige 1)									February 20	000	
Activated Performing Profit Profi	APPROPRIATION/BUDGET ACTI	VITY	PROGRAM ELE	EMENT			PROJECT NA	AME AND NUN	1BER				
Control Method Activity & Cost to activate including including including the mile of the cost of t	RDT&E, N/BA-4		Advanced Si		ys Dev/0603	3561N	Advanced Su	bmarine Comb	at Systems De	evelopment/V0	223		
4. Type Location Cost Cost Date Cost Cont	Cost Categories	Contract	Performing	Total PV s	FY 99	FY 99	EV 00	FY 00 Award	FV 04	FY 01	ost to	Total	Tarnet Value
RCP NUMC Newport, RI 0.000 0.000 0.000 0.000 0.000 CONT CONT<	Requirements)	& Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
RCP NUMCA (Septical) 0,000	Product Development	WR	NUWC Newport, RI	0.000	0.000		29.232	10/99	21.321	10/00	CONT.		
RCP NRLWARSHINGTON 0.000 0.000 0.000 - CONT NRCP NRSWC_Candences, MD 0.000 0.000 1.306 1.000 0.000 - CONT NRCP NRSWC_Candences, MD AMARIS 0.000 0.000 0.000 - CONT - CONT NRCP NRSWC_Candences, MD AMARIS 0.000 0.000 0.000 0.000 - CONT NRCP NRSWCCSSC Sen Diego, CA Litian 0.000 0.000 0.000 0.000 0.000 NRS NRMARL 0.000 0.000 0.000 0.000 0.000 0.000 NRS NRMARL 0.000	Product Development	RCP	NUWC Newport, RI	0.000	0.000		0.000		0.000		CONT.	CONT.	
RCP INELVISEMENTATION 0.000 0.000 0.000 - CONT. RCP INELVISEMENTATION 0.000 0.000 1.300 1.600 1.600 - CONT. RCP INSWC Cardencek, MID AMSI 0.000 0.000 0.000 - CONT. RCP INSWC Cardencek, MID AMSI 0.000 0.000 0.000 - CONT. RCP INSWC Cardencek, MID AMSI 0.000 0.000 0.000 - CONT. RCP INSWC Cardencek, MID AMSI 0.000 0.000 0.000 - CONT. RCP INSWC Cardencek, MID AMSI 0.000 0.000 0.000 0.000 0.000 0.000 0.000 MRR INCROSS S Bings, CA-Litron 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.001 0.000 0.001 0.001 0.001	Product Development	WR	NRL/Washington	0.000	0.000		1.962	10/99	2.050	10/00	CONT.	CONT.	
WRCP NISWIC Cardenced, MD 0.0000 0.0000 1.308 10999 1.550 10000 CONT. WRCP NCSWIC Cardenced, MD AMSI 0.0000	Product Development	RCP	NRL/Washington	0.000	0.000		0.000		0.000		CONT.	CONT.	
RCP INSWC CARGINGTOCK, MD AMSI 0.000 0.0000	Product Development		NSWC Carderock, MD	0.000	0.000		1.308	10/99	1.500	10/00	CONT.	CONT.	
WR NCCOSC San Diago, CA 0.000 0.000 10:000 0.000 CONT. WR NCCOSCS S Diago, CA Litan 0.000	Product Development		NSWC Carderock, MD AMSI	0.000	0.000		0.000		0.000	•	CONT.	CONT.	
RCP INCOSIC S Diego, CA Lifton 0.000 0.0	Product Development	WR	NCCOSC San Diego, CA	0.000	0.000		0.150	10/99	0.160	10/00	CONT.	CONT.	
WRA INSMARL 0.000 0.000 0.000 - CONT. RCP NSBAA 0.000 0.000 0.1600 0.000 - CONT. WRA NUNDAK Repport, HI 0.000 0.000 0.100 0.000 - CONT. MIPR U.S. ArrivalMITRE 0.000 0.000 1.299 2.000 1.200 CONT. RCP ONRULINCSI 0.000 0.000 0.000 1.299 1.000 1.000 CONT. RCP ONRULINASSIY of California 0.000	Product Development	RCP	NCCOSC S Diego, CA Litton	0.000	0.000		0.000		0.000	•	CONT.	CONT.	
RCP NSMA 0.000 0.000 0.000 0.180 0.010 0.000 CONT MIPR US. Auf-ForceMart Lincoin Labs 0.000 0.000 1.000<	Product Development	WR	NSMRL	0.000	0000		0.000		0000	•	CONT.	CONT.	
WRR NUMC Keyport, HI 0,000	Product Development		NSMA	0.000	0.000		0.180	03/00	0.180	10/00	CONT.	CONT.	
MIPR U.S. ArmyMITRE 0.000 0.000 0.000 1200 1200 CONT. MIPR U.S. ArmyMITRE 0.000 0.000 0.000 1.200 1.200 1.200 CONT. RCP ONRALIC 0.000 0.000 0.000 0.000 0.000 - CONT. RCP ONRALINESIN 0.000 0.000 0.000 0.000 0.000 - CONT. RCP ONRALINESIN 0.000 0.000 0.000 0.000 0.000 - CONT. SSCPFF ALLALHU, MA 0.000 0.000 0.000 0.000 - CONT. SSICPFR ARLUT, TX 0.000 0.000 0.000 0.000 - CONT. SSICPFR ARLUT, LWA 0.000 0.000 0.000 0.000 0.000 0.001 MR SSICPFR ARLUT, LY 0.000 0.000 0.000 0.000 0.000 0.000 MR SPWAR, CA 0.000 <td>Product Development</td> <td></td> <td>NUWC Keyport, HI</td> <td>0.000</td> <td>0.000</td> <td></td> <td>0.100</td> <td>10/99</td> <td>0.000</td> <td></td> <td>CONT.</td> <td>CONT.</td> <td></td>	Product Development		NUWC Keyport, HI	0.000	0.000		0.100	10/99	0.000		CONT.	CONT.	
MIPR U.S. Air ForceMITL Lincoln Labs 0,000 0,000 0,800 12/90 1,000 12/00 CONT. RCP ONRAMICCI 0,000 <td< td=""><td>Product Development</td><td>MIPR</td><td>U.S. Army/MITRE</td><td>0.000</td><td>0.000</td><td></td><td>2.000</td><td>12/99</td><td>2.000</td><td>12/00</td><td>CONT.</td><td>CONT.</td><td></td></td<>	Product Development	MIPR	U.S. Army/MITRE	0.000	0.000		2.000	12/99	2.000	12/00	CONT.	CONT.	
RCP ONRAMCCI 0.000 0.000 1.400 01/00 - CONT. RCP ONRADBANCI 0.000 0.000 0.000 - CONT. CONT. RCP ONRADBANCI 0.000 0.000 0.000 - CONT. CONT. RCP ONRADBANCI 0.000 0.000 0.000 0.000 CONT. CONT. SS/CPFF ARL/HU, MD 0.000 0.000 0.000 0.000 0.000 0.000 SS/CPFF ARL/HU, MD 0.000 0.000 0.000 0.000 0.000 0.000 0.000 SS/CPFF ARL/HU, MD 0.000 <td>Product Development</td> <td>MIPR</td> <td>U.S. Air Force/MIT Lincoln Labs</td> <td>0.000</td> <td>0.000</td> <td></td> <td>0.800</td> <td>12/99</td> <td>1.000</td> <td>12/00</td> <td>CONT.</td> <td>CONT.</td> <td></td>	Product Development	MIPR	U.S. Air Force/MIT Lincoln Labs	0.000	0.000		0.800	12/99	1.000	12/00	CONT.	CONT.	
RCP ONR/University of California 0.000 0.000 0.000 - CONT. RCP ONR/BBN 0.000 0.000 1.986 0.000 - CONT. RCP ONR/BBN 0.000 0.000 1.986 1.2345 0.1/01 CONT. SS/CPFF APL/JUL, MA 0.000 0.000 0.000 0.000 0.000 0.000 SS/CPFF APL/JUL, MA 0.000 0.000 0.000 0.000 0.000 0.000 SS/CPFF APL/JUL, MA 0.000 0.000 0.000 0.000 0.000 0.000 SS/CPFF APL/JUL, TX 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.001 0.000 <td< td=""><td>Product Development</td><td></td><td>ONR/MCCI</td><td>0.000</td><td>0.000</td><td></td><td>1.400</td><td>01/00</td><td>1.400</td><td>01/01</td><td>CONT.</td><td>CONT.</td><td></td></td<>	Product Development		ONR/MCCI	0.000	0.000		1.400	01/00	1.400	01/01	CONT.	CONT.	
RCP ONR/BBN 0.000 0.000 0.000 - CONT. SSCPFF ACL/JHU, MA 0.000 0.000 1.986 2.315 01/01 CONT. SSCPFF APL/JHU, MA 0.000 0.000 0.000 0.000 - CONT. SSCPFF APL/JHU, MA 0.000 0.000 0.000 0.000 - CONT. SSCPFF APL/JHU, TX 0.000 0.000 0.000 0.000 0.000 0.000 SSCPFF APL/JHO, TX 0.000 0.000 0.000 0.010 0.000 0.000 MD ARL/JHO, TX 0.000 0.000 0.000 0.010 0.010 0.001 0.000 MD ARL/JHO, TX 0.000 0.000 0.000 0.100 0.100 0.000 0.000 0.001 0.001 0.001 0.001 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 <t< td=""><td>Product Development</td><td></td><td>ONR/University of California</td><td>0.000</td><td>0.000</td><td></td><td>0.000</td><td></td><td>0000</td><td>•</td><td>CONT.</td><td>CONT.</td><td></td></t<>	Product Development		ONR/University of California	0.000	0.000		0.000		0000	•	CONT.	CONT.	
RCP ONRIGTRI 0.000 0.000 1.986 2.315 01/01 CONT. SS/CPFF ARLUHU, MD 0.000 0.000 7.207 12/99 7.200 01/01 CONT. SS/CPFF ARLUHU, MD 0.000 0.000 0.000 0.000 0.000 0.000 SS/CPFF ARLUHU, TX 0.000 0.000 0.000 0.000 0.000 0.000 MD ARLUFSU, PA 0.000 0.000 0.000 0.000 0.000 0.000 0.000 PD NAVAIR PAXINSWC Indian H 0.000 0.000 0.000 0.000 0.000 0.000 0.000 WR SPWAR, CA 0.000 0.00	Product Development		ONR/BBN	0.000	0.000		0.000		0.000	•	CONT.	CONT.	
SS/CPFF ARLUHU, MD 0.000 0.000 7.207 12/99 7.200 0.1001 CONT. SS/CPFF ARLUHU, WA 0.000 0.000 0.000 0.000 - CONT. SS/CPFF ARLUH, TX 0.000 0.000 0.000 0.000 0.000 0.000 SS/CPFF ARLURSU, PA 0.000 0.000 0.000 0.130 0.150 0.101 CONT. PD NAVAIR PAXNSWC Indian H 0.000 0.000 0.000 0.100 0.100 0.000 - CONT. WR SPWAR, CA 0.000 0.000 0.000 0.000 0.100 0.100 0.000 - CONT. CONT. <td>Product Development</td> <td></td> <td>ONR/GTRI</td> <td>0.000</td> <td>0.000</td> <td></td> <td>1.986</td> <td></td> <td>2.315</td> <td>01/01</td> <td>CONT.</td> <td>CONT.</td> <td></td>	Product Development		ONR/GTRI	0.000	0.000		1.986		2.315	01/01	CONT.	CONT.	
SSICPFE APL/UW, WA 0.000 0.000 0.000 0.000 0.000 CONT. SSICPFE ARLUT, TX 0.000 0.000 0.000 0.000 0.010 CONT. CONT. SSICPFE ARLPSU, PA 0.000 0.000 0.000 0.000 0.135 10/00 CONT. CONT. PD NAVAIR PAXISWC Indian H 0.000 0.000 0.000 0.000 0.000 0.000 CONT. CONT. CIFP DSI, VA 0.000 0.000 0.000 0.000 0.000 0.000 CONT. CONT. CICPF DSI, VA 0.000 0.000 0.000 0.000 0.000 0.000 CONT. CONT. CICPF DSR, VA 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 CONT. CONT.<	Product Development	SS/CPFF	ARL/JHU, MD	0.000	0.000		7.207	12/99	7.200	01/01	CONT.	CONT.	
SSICPFE ARLUT, TX 0.000 0.000 0.000 0.000 0.000 0.010 CONT. MD ARLPSU, PA 0.000	Product Development	SS/CPFF	APL/UW, WA	0.000	0.000		0.000		0.000	٠	CONT.	CONT.	
SS/CPFF ARL/PSU, PA 0.000 0.000 0.315 12/99 0.350 10/00 CONT. MD ARL/PSU, PA 0.000	Product Development	SS/CPFF	ARL/UT, TX	0.000	0.000		7.200	12/99	7.000	01/01	CONT.	CONT.	
MD ARL/PSU, PA 0.000 0.000 0.030 0.130 0.160 0.160 0.101 CONT. PD NAVAIR PAXNISWC Indian H 0.000 0.000 0.000 0.000 0.000 - CONT. C WR SPWAR, CA 0.000 0.000 0.000 0.000 0.000 - CONT. C C/CPFF DSI, VA 0.000 0.000 0.000 0.000 0.000 - CONT. C/CPFF TWD Associate, VA 0.000 0.000 0.000 0.000 0.000 - CONT. C/CPFF INIS, VA 0.000 0.000 0.000 0.000 0.000 - CONT. C/CPFF INIS, VA 0.000 0.000 0.000 0.000 - CONT. C/CPFF Systems Planning Analysis, VA 0.000 0.000 0.000 - CONT. MIPR DARPA, VA 0.000 0.000 0.000 0.000 0.000	Product Development	냂	ARL/PSU, PA	0.000	0.000		0.315	12/99	0.350	10/00	CONT.	CONT.	
PD NAVAIR PAX/NSWC Indian H 0.000 0.000 0.000 0.000 CONT. WR SPWAR, CA 0.000 0.000 0.000 0.000 0.000 CONT. C/CPFF DSI, VA 0.000 0.000 0.000 0.000 0.000 0.000 C/CPFF TWD Associate, VA 0.000 0.000 0.000 0.000 0.000 0.000 C/CPFF Systems Planning Analysis, VA 0.000 0.0	Product Development		ARL/PSU, PA	0.000	0.000		0.130	01/00	0.150	01/01	CONT.	CONT.	
WR SPWAR, CA 0.000 0.000 0.100 10/99 0.100 10/00 CONT. C/FP DSI, VA 0.000 0.000 0.000 0.000 - CONT. C/CPFF DSI, VA 0.000 0.000 0.000 0.000 12/99 6.000 12/00 CONT. C/CPFF TOPFF DSI, VA 0.000 0.000 0.000 0.000 - CONT. C/CPFF Systems Planning Analysis, VA 0.000 0.000 0.000 0.000 - CONT. MIPR DARPA, VA 0.000 0.000 0.000 0.000 0.000 - CONT.	Product Development	9	NAVAIR PAX/NSWC Indian H	0.000	0.000		0.000		0.000	•	CONT.	CONT.	
C/FP DSI, VA 0.000 0.000 0.000 - CONT. C/CPFF DSR, VA 0.000 0.000 0.000 7.000 7.000 12/99 6.000 CONT. C/CPFF Transcription of the control of the cont	Product Development	WR	SPWAR, CA	0.000	0.000		0.100	10/99	0.100	10/00	CONT.	CONT.	
C/CPFF DSR, VA 0.000 0.000 0.000 7.000 12/99 6.000 12/00 CONT. C/CPFF TWD Associate, VA 0.000 0.000 0.000 0.000 - CONT. C/CPFF INIS, VA 0.000 0.000 0.000 0.000 - CONT. MIPR DARPA, VA 0.000 0.000 0.000 0.000 - CONT.	Product Development	C/FP	DSI, VA	0.000	0.000		0.000		0.000		CONT.	CONT.	
CyCPFF TWD Associate, VA 0.000 0.000 0.000 - CONT. CPFF INNS, VA 0.000 0.000 0.000 - CONT. CYCPFF Systems Planning Analysis, VA 0.000 0.000 0.000 - CONT. MIPR DARPA, VA 0.000 0.000 0.000 12/00 CONT.	Product Development		DSR, VA	0.000	0.000		7.000	12/99	6.000	12/00	CONT.	CONT.	
CPFF INNS, VA 0.000 0.000 0.000 CONT. C/CPFF Systems Planning Analysis, VA 0.000 0.000 0.000 - CONT. MIPR DARPA, VA 0.000 0.000 0.000 0.000 12/00 CONT.	Product Development	П	TWD Associate, VA	0.000	0.000		0.000		0.000	-	CONT.	CONT.	
CPFF INNS, VA 0.000 0.000 0.000 - CONT. C/CPFF Systems Planning Analysis, VA 0.000 0.000 0.000 - CONT. MIPR DARPA, VA 0.000 0.000 0.000 12/00 CONT.	Product Development		Electric Boat, CT	0.000	0.000		0.000		0.000	•	CONT.	CONT.	
C/CPFF Systems Planning Analysis, VA 0.000 0.000 0.000 - CONT. MIPR DARPA, VA 0.000 0.000 0.000 0.000 12/00 CONT.	Product Development		NNS, VA	0.000	0.000		0.000		0.000	•	CONT.	CONT.	
. MIPR DARPA, VA 0.000 0.000 0.000 12/00 CONT.	Product Development	П	Systems Planning Analysis, VA	0.000	0.000		0.000		0.000	•	CONT.	CONT.	
	Product Development	MIPR	DARPA, VA	0.000	0.000		0.000		9.000	12/00	CONT.	CONT.	

R-1 SHOPPING LIST - Item No. 47

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 16 of 18)

UNCLASSIFIED

								DATE:				
Exhibit R-3 Cost Analysis (page 1)	9 1)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	 ≥	PROGRAM	PROGRAM ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	IBER		:		
RDT&E, N/BA-4		Advance	Advanced Submarine	Sys Dev/0603561N	03561N	Advanced Sui	Advanced Submarine Combat Systems Development/V0223	at Systems De	velopment/V02	223		
Cost Categories	Contract Performing	Performing			FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method Activity &	Activity &	PΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
	& Type	Location	Cost	Cost	Date		Date	Cost	Date	Complete	Cost	of Contract
	C/CPFF Various	/arious	0.000	0.000		1.016	Various	1.000	Various	CONT.	CONT.	
ced Towed Array BAA	C/CPFF L	C/CPFF Lockheed Martin, NY	0.000	0000		1.200	12/99	1.000	12/00	CONT.	CONT.	
Product Development	Various Various	/arious	0.000	0.000		4.825	Various	0.000	Various	CONT.	CONT.	
Subtotal Product Development			0000	0000		68.111		64,389		CONT.	CONT.	
Remarks:												
Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
LLC												_

Remarks: This is a Non Acquisition Program which therefore includes no indirect support costs.

0.000

0.000

0.000

GFE Subtotal Support R-1 SHOPPING LIST - Item No. 47

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 17 of 18)

UNCLASSIFIED

								DATE:		L		
Exhibit R-3 Cost Analysis (page 2)	Je 2)	111111111111111111111111111111111111111	1147147			AN TOPI COOL	OCCUPANT AND NI MARES	1000		repruary 2000	00	
APPROPRIATION/BUDGET ACTIVITY RDT&F N/BA-4	<u>-</u>	Advanced Submar	PRUGRAM ELEMENT Advanced Submarine	Svs Dev/0603561N	303561N	Advanced Sul	PROJECT INTIME AND NOMBER Advanced Submarine Combat Systems Development/V0223	at Systems De	velopment/V0	223		
Cost Categories	Contract	Performing	Total	_	FY 99		FY 00		FY 01			
or System/Item	Method	Activity &	PΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
		Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Developmental Test & Evaluation		NUWC Newport, RI	0.000	0.000		0.450	10/99	0.450	10/00	CONT.	CONT.	
		Various	0.000	0.000		0.050	Various	0.164	Various	CONT.	CONT.	
Operational Test & Evaluation										0.000	0.000	
GFE										0.000	0.000	
Subtotal T&E			0.000	0.000		0.500		0.614		CONT.	CONT.	
	11000	TO AND A PART OF THE PART OF T	000	0000		0 400	Various	000		TNOO	TNOO	
Program management Support	1 100	Illegiated Flodge Dec, O.	200	2000		200	12,00	900	12/00	TIACO	TIVO	
Program Management Support	Т	Stanley Associates, VA	0.000	0.000		0.900	1,75	200.5	20/21		FINE	
Program Management Support	Various	Various	0.000	0.000		0.000	Various	0000			CONT.	
Government Engineering Support											0.000	
Travel											0.000	
Overhead											0000	
Subtotal Management			0.000	0.000		1.300		2.000		CONT.	CONT.	
Remarks:												
			,									
Total Cost			0.000	0.000		69.911		67.185		CONT.	CONT.	
Remarks:												
										:		

R-1 SHOPPING LIST - Item No. 47

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 18 of 18)

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification	E Budget Item Ju	stification				DATE:	Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION: NAVY/BA-4	Y/BA-4			R-1 ITEM NON Program Elem	R-1 ITEM NOMENCLATURE Program Element (PE) Name	and No. Subm	arine Tactical	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. Submarine Tactical Warfare Systems/0603562N	303562N
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Total PE Cost	3.893	4.643	4.356	5.401	5.685	5.816	5.921	CONT.	CONT.
Advanced Sub. Spt. Equipment/F0770	1.896	2.318	2.466	3.331	3.444	3.529	3.588	CONT.	CONT.
Sub. Special Ops. Spt. Devel./V1739	1.997	2.325	1.890	2.070	2.241	2.287	2.333	CONT.	CONT.
Quantity of RDT&E Articles	ო	2	2	က	က	2	2	CONT.	CONT.

A. (U) Mission Description and Budget Item Justification: The Submarine Tactical Warfare Systems program element is comprised of the Advanced Submarine Support through the development and implementation of advanced Research and Development (R&D) and Electronic Support Measures (ESM) technologies. The goal of the ASSEP is to increase submarine operational effectiveness through advanced R&D of Radar Cross Section Reduction (RCSR), Sensors (RF, Photonics Mast, IR etc.) and the electronic warfare technologies to enhance stealth, threat warning, strike and tactical surveillance. A continuing need exists to improve submarine capabilities in the adversaries. The Submarine Special Operations Support Development program responds to the increased threat of Naval activity in the Littorals and the continuing threat of submarine and surface ship activity in regions of the world through the development of advanced submarine R& D technology to provide improved operational capability in shallow water regions. Particular emphasis is placed in the areas of sonar operability and maintainability, Littoral operations, mine warfare, tactical surveillance, and other development of class specific Arctic operational guidelines and the testing of ice-capable submarine support structures. This program also provides the framework for various Equipment Program (ASSEP) and the Submarine Special Operations Support Development Program. The overall objective is to improve submarine operational effectiveness increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential submarine support missions. Efforts include assessment of combat system effectiveness, development of Arctic shallow water specific improvements for existing sonars, R& D programs to conduct Test and Evaluation in shallow water and Arctic regions.

B. (U) Program Change Summary: (show total funding, schedule, and technical changes for the program element that have occurred since the last submission).

				_
	FY 1999	FY 2000	FY 2001	
FY 2000 President's Budget:	4.676	4.667	4.330	
Appropriated Value:	4676	4.667		
Adjustment to FY 1999/2000 Appropriated Value/	-0.783	-0.024	0.026	
FY 2000 President's Budget:				
FY 2001 PRES Budget Submit:	3.893	4.643	4.356	
1				

R-1 SHOPPING LIST - Item No. 48

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 12)

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budg APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-	get Item Justification February 2000 R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. Submarine Tactical Warfare Systems/0603562N
--	--

(U) Change Summary Explanation:

(U) Funding: FY99 adjustments are due to a SBIR transfer (-\$0.090), minor program adjustments of (-\$0.630), Congressional Undistributed Reductions (-\$0.159) Inflation Savings

FY01 funding decrease is due to General Administrative reduction (-\$0.20), NWCF Rate increase (\$0.076), outsourcing adjustment (\$0.24), CEWG reduction (-\$0.14), NUWC Reduction (-\$0.04), minor program adjustments of (-\$0.105), Nonpay Purchase Inflation reduction (-\$0.30). FY00 funding decrease is due to Across the Board reductions (-\$0.24), and \$.071M of the extramural program is reserved for SBIR assessment IAW 15USC 638.

(U) Schedule: As a result of the DD 1002 update reduction in FY1999 the Imaging Auto Recognition and Tracking and Counter Detection/Range Assessment hardware design have been delayed one year to FY00.

(U) Technical: Not applicable.

R-1 SHOPPING LIST - Item No.

(Exhibit R-2, page 2 of 12) Exhibit R-2, RDT&E Budget Item Justification

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	ification				DATE:			
								Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	EMENT NAME	AND NUMBE	&	PROJECT NAME AND NUMBER	ME AND NUME	3ER			
RDT&E, N/BA-4	Submarine	Tactical Wa	rfare Sys/06	303562N	Submarine Tactical Warfare Sys/0603562N Advanced Submarine Support Equipment Program (ASSEP)/F0770	marine Suppor	t Equipment Pr	ogram (ASSEI	P)/F0770	
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		1.896	2.318	2.466	3.331	3.444	3.529	3.588	CONT.	CONT.
RDT&E Articles Qty		2	0	-	-	2	0	4	CONT.	CONT.

A. (U) Mission Description and Budget Item Justification: This program develops submarine ESM equipment and image processing technology. A continuing need exists to improve submarine capabilities in these areas to enhance operational effectiveness in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Improvements are necessary for submarine ESM and imaging to be state of the art in radar absorbent material, resulting in potential periscope/mast engineering improvements to reduce the counter-detection threat. The STIP and ESMTIP that are available from DOD Exploratory Development Programs, industry Independent Research and Development, and other sources. Feasibility demonstration models human/ machine interface (HMI) enhancements. All programs funded in this project are non- acquisition category programs in accordance with Non-Acquisition Program effective in conducting the following mission areas: Joint Littoral Warfare, Joint Surveillance, Space and Electronic Warfare, Intelligence Collection, Maritime Protection and Joint Strike. Specific efforts include development of: Radar Cross Section Reduction (RCSR) Techniques, Sensor Technology Insertion Program (STIP), and ESM Technology Insertion Program (ESMTIP). The RCSR evaluates the vulnerability of submarine masts, periscopes and sensors to radar and infrared threats and evaluates the programs develop submarine unique improvements to mast, periscope and hull mounted ESM electromagnetic and electro-optic sensors based on emerging technologies (FDMs) are developed to provide a realistic method of evaluating the improvements, including deployment on submarines for testing. STIP projects include: Radio frequency (RF) extensions; RF bandwidth improvements; passive localization; upgrades to the Imaging Mast sensors and software; and advanced antenna arrays for beam steering and high resolution direction finding enhancements. ESMTIP projects include: improvements to signal sorting and recognition methods to support classification and identification of ESM contacts encountered during Littoral operations; signal processing improvements for processing of low probability of intercept signals; voice/ language recognition and Definition Document (NAPDD) # 556-872-872E1. The test articles identified consist of critical components of FDM's that will be fully developed during engineering development into Engineering Development Models (EDM's).

R-1 SHOPPING LIST - Item No. 48

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 3 of 12)

UNCLASSIFIED

EXHIBI	EXHIBIT R-2a, RDT&E Project Justification	DATE:
		February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	Submarine Tactical Warfare Sys/0603562N	Advanced Submarine Support Equipment Program (ASSEP)/F0770

- (U) Program Accomplishments and Plans:
- (U) FY 1999 Accomplishments:
- 0.275) Continued Radar Cross Section Reduction (RCSR) techniques and materials investigation.
 - 1.049) Continued STIP development of Passive Localization.
- 0.572) Initiated STIP and Electronic Support Measures Technology Insertion Program (ESMTIP) development of Photonics/Type 18 Low Band Direction Finding (DF) and Counter Detection and Range Assessment software development.
 - (U) The estimated total cost of the two sets of Feasibility Demonstration Models (FDM) components initiated during this fiscal year is \$0.8M.
- (U) FY 2000 Plans:
- 0.275) Continue RCSR techniques and materials investigation.
- 1.243) Continue STIP development of Passive Localization, Imaging (Photonics) Auto Target Recognition and Tracking(started in FY98) and Photonics/Type 18 Low Band DF.
 - 0.284) Continue ESMTIP development of Counter Detection and Range Assessment.
 - 0.516) Initiate ESMTIP development of Combat Control System (CCS) interface for SSN 688 and Integrated Electronic Support (ES) Workstation.
- 0.283) Continue RCSR techniques and material investigation. (U) FY 2001 Plans: (U) (\$ 0.283) Con
- 1.049) Continue STIP development of Passive Localization, Imaging (Photonics) Auto Target Recognition and Tracking and Photonics/Type 18 Low Band.
 - 0.221) Initiate STIP development of Advanced Shared Aperature Comms Antennas.
- 0.913) Continue ESMTIP development of CCS Interface for SSN 688, Integrated ES Workstation and Counter Detection/Range Assessment.
 - The estimated total cost of the one set of FDM components initiated during this fiscal year is \$0.8M

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(Exhibit R-2a, page 4 of 12) Exhibit R-2a, RDT&E Project Justification

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HIBIN	EXHIBIT R-2a, RDT&E Project Justification	PD	DATE:
			February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	8
RDT&E, N/BA-4	Submarine Tactical Warfare Sys/0603562N	Advanced Submarine Support Ed	Advanced Submarine Support Equipment Program (ASSEP)/F0770

- B. (U) Other Program Funding Summary: Not applicable.
 - (U)Related RDT&E:
- (U) PE 0604503N(Submarine System Equipment Development)
 - (U) PE 0604558N(New Design SSN Development) (U) PE 0604777N(Navigation /ID Systems)
- that are available from DOD Exploratory Development Programs, industry Independent Research and Development, and other sources. Feasibility Demonstration Models C. (U) Acquisition Strategy: This project will optimize technology insertion using a build-test-build approach to support ES operational needs. Operational needs have been assessment and prioritization of Sensor and Processor efforts and SSN force level projections for SSN688/688I and SSN21 classes through FY2015. The STIP and ESMTIP efforts will develop submarine unique improvements to mast, periscope and hull mounted ESM electromagnetic and electro-optic sensors based on emerging technologies based on 1998 COMSUBLANT/COMSUBPAC Command Capability Issues (CCIs), Virginia Class SSN Operational Requirements Document objectives, a review, (FDMs) will be developed to provide a realistic method of evaluating the improvements, including deployment on submarines for testing.
- D. (U) Schedule Profile. See attached schedule.

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(Exhibit R-2a, page 5 of 12) Exhibit R-2a, RDT&E Project Justification

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FXHIRIT R-2a RDT&F Project Instification	PROGRAM ELEMENT NAME AND NUMBER PROJECT NAME AND NUMBER	Submarine Tactical Warfare Sys/0603562N Advanced Submarine Support Equipment Program (ASSEP)/F0770	
EXHIRIT R-2a	APPROPRIATION/BUDGET ACTIVITY PROG	RDT&E, N/BA-4	

ASSEP Schedules Revised 5/27/99

				-			
	FY99	FY00	FY01	FY02	FY03	FY04	FY05
Mast Radar Cross-Section Reduction	Signalare	Skinninee Base Over Water Test		Next Gen Synathre Study		Delver FIM	W
Sensor Technology Insertion Projects (STIPs)	chnology	Insertion	Projects	(STIPs)			
Passive Ranging Ranging	Performance Spec	Medicarion mes	М	Ar-Sea Cerling	Feeting		
Imaging Auto Recognition and Track		Performance	por Deliver	r Frack S/W	Deliver Record SVV	SW M.Sea Testing	athg
BVS-1/EWR Frequency Coverage Extension				Performance S	and.		Define FDM
Advanced Shared Aperture Comms Antennas			Сонсер	Concept Study Design	Design Int Spec		
Photonics/Type 18 Low Band Radar DF	Concept For	Concept Formulation Performance Spec	e Spec Contract Award	,ward	Defree FD	II.	
Submarine Offboard Vehicle ESM Sensor				Concept Formulation	athon Performance Spec	Spec Contract Award	ward
ESM Technology Insertion Projects (ESMTIPs)	nology Ins	sertion Pr	ojects (ES	(MTIPs)			
Counter Detection/Range Assessment	Concept Definition 7 set Red Assy	1 Test Bed Ausy	Flee Eval	At-See Testing	Final ECP		
CCS Interface for SSN 688		Interface Spec		S.W. Test	K.and.Based Testing	Lesting	
Integrated ES Workstation		Interface Spec		SAW Belivery	Fret Evaluation		
Communications Signal Onboard Trainer				Desta Concu	•		
						J	

R-1 SHOPPING LIST - Item No.

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 6 of 12)

UNCLASSIFIED

									DATE:				
Exhibit R-3 Cost Analysis (page 1)	-										February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	_		PROGRAM ELEMENT	EMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E, N/BA-4			Sub Tactical Warfare	Il Warfare S	Systems/0603562N	13562N	Advanced S	ubmarine Sup	port Equipme	ent Program (Advanced Submarine Support Equipment Program (ASSEP)/F0770		
	ontract	Contract Performing		Total		FY 99		FY 00		FY 01			
or System/Item	fethod ,	Method Activity &	- =	PYs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
	& Type	Location		Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
are Development												CONT.	
	C/CPIF	JHU/APL Laurel, MD	el, MD	3.100	0.000	Α/N	0.000	ΑΝ	0.000	N/A	0.000	3.100	3.100
												CONT.	
Ancillary Hardware Development												0.000	
	WR	NUWC Newport, RI	rt, RI	9.300	0.717	11/98	1.445	11/99	1.676	11/00	CONT.	CONT.	N/A
Licenses												0.000	
Tooling												0.000	
	¥	N/A		0.000	0.000	N/A	0000	ΑΝ	0000	Various	N/A	N/A	N/A
ellaneous	Sign	Various		7.072	0.985	Various	0.627	Various	0.556	Various	CONT.	CONT.	N/A
	Π											0.000	
Subtotal Product Development				19.472	1.702		2.072		2.232		0.000	25.478	
Remarks:													

Development Support Equipment				_		-					0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management								-			0.000	
Engineering Technical Services	Various Various	Various	0.900	0.031	11/98	0.058	11/99	090'0	11/00	CONT.	CONT.	N/A
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.900	0.031		0.058		0.060		0.000	1.049	

Remarks:

R-1 SHOPPING LIST - Item No. 48

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 7 of 12)

UNCLASSIFIED

									DATE:				
Exhibit R-3 Cost Analysis (page 2)	e 2)										February 2000	000	
APPROPRIATION/BUDGET ACTIVITY	ΣL	ш_	PROGRAM ELEMENT	MENT			PROJECT N	PROJECT NAME AND NUMBER	WBER				
RDT&E, N/BA-4		3 ,	Sub Tactical Warfare	Warfare S	Systems/0603562N	03562N	Advanced S	ubmarine Su	pport Equipm	ent Program	Advanced Submarine Support Equipment Program (ASSEP)/F0770		
Cost Categories	Contract	Contract Performing	Ľ.			FY 99		FY 00		FY 01	:		
(Tailor to WBS, or System/Item	Method /	Activity & Location	<u>n. ()</u>	PY s Cost	FY 99 Cost	Award	FY 00 Cost	Award	FY 01	Award Date	Cost to Complete	Total	Target Value of Contract
Test & Evaluation	Т											0.000	
Operational Test & Evaluation												0.000	
Tooling												0.000	
GFE												0.000	
Subtotal T&E				0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:													Make .
Contractor Engineering Support												0.000	
Government Engineering Support												0.000	
Program Management Support												0.000	
Management Support Services	C/CPIF/CP Various	Various		1.000	0.146	11/98	0.173	11/99	0.158	11/00	CONT.	CONT.	N/A
Studies Analysis & Evaluations	MIPR	Mitre, Mclean, Va	3	0.800	0.000	N/A	0.000	N/A	0.000	N/A	0.000	0.800	0.800
Travel	TO's	Various		0.128	0.017	10/98	0.015	10/99	0.016	10/00	CONT.	0.176	CONT.
Labor (Research Personnel)												0.000	
Overhead												0.000	
Subtotal Management				1.928	0.163		0.188		0.174		0.000	2.453	CONT.
Remarks:													A 644 - 3399
Total Cost				22.300	1.896		2.318		2.466		CONT.	CONT.	
Remarks:													

R-1 SHOPPING LIST - Item No. 48

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 8 of 12)

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	ject Justi	fication				DATE:			
								Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	INT NAME	AND NUMBE		PROJECT NAME AND NUMBER	ME AND NUM	3ER			
RDT&F. N	Submarine Tactical Warfare Systems/P.E. 0603 Submarine Special Operations Support Development/V1739	tical War	fare Syster	ns/P.E. 060	Submarine Spe	scial Operation	s Support Deve	elopment/V173	6	
İ				7000	000071	2000	200	2005	EV 2005 Total Complete	Total Cost
COST (\$ in Millions)	1	۲ 1999	FY 2000	F ¥ 2001	FT 2002	L 2003	F1 2004	2007	STATE OF THE STATE	1000
Project Cost		1.997	2.325	1.890	2.070	2.241	2.287	2.333	CONT	CONT
DDTSE Aridas Ofv	A	fic ex 1	Arctic ex 2	Arctic ex 1	Arctic ex 1 Arctic ex 2 Arctic ex 1 Arctic ex 2 Arctic ex 1 Arctic ex 2 Arctic ex 1	Arctic ex 1	Arctic ex 2	Arctic ex 1	CONT	CONT
אין וומפט אין										

conbat system effectiveness, use of high frequency sonars in Arctic regions, testing of ice-capable submarine structures, and development of class specific Arctic shallow water operational guidelines. This program also provides the framework for various Research and Development (R&D) programs to conduct Test and Evaluation in the shallow water and Arctic regions. A. (U) Misison Description an Budget Item Justification: This program responds to the increased threat of Naval activity in the Littoral and continuing threat of submarine and surface ship activity in all regions of the world throught the development of advanced submarine concepts. It places particular emphasis on submarine operability and mission support in unique environments. Efforts include assessment of

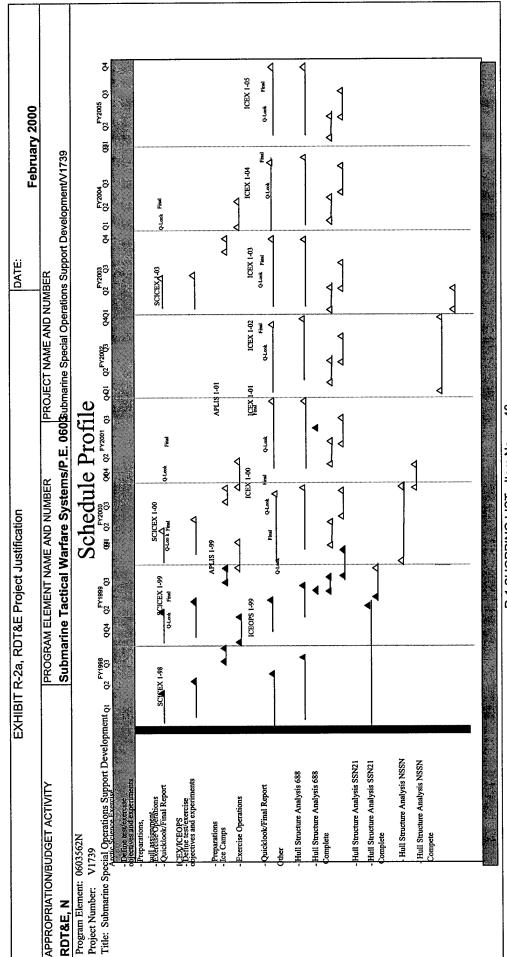
- (U) Program Accomplishments and Plans
- 1. (U) FY 1999 Plans
- (U) (\$1.997) Conduct/Support an Arctic Science Exercise (SCICEX), Ice Exercice (ICEX) 1-99 and Ice Operation (ICEOPS) 1-99, and plan for ICEX 1-00.
- 2. (U) FY 2000 Plans
- (U) (\$2.125) Conduct/Support SCICEX 1-00 and ICEX 1-00 (U) (\$0.200) Perform Structual Analysis for SSN 21 and Virginia Class Submarines
- 3. (U) FY 2001 Plans
- . (U) (\$1.890) Conduct/Support Ice Exercise 1-01 and Ice Camp Operations

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(Exhibit R-2a, page 9 of 12) Exhibit R-2a, RDT&E Project Justification

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R-1 SHOPPING LIST - Item No. 48

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 10 of 12)

CLASSIFICATION:

UNCLASSIFIED

PROJECT NAME AND NA	Exhibit R-3 Cost Analysis (pa	•											
PROJECT NAME AND NUMBER PROGRAM ELEMENT PROJECT NAME AND NUMBER		ge 1)		,							February 20	00	
RE_IN Submarine Tactical Warfare Systems/P E. Office Inchming FX office Inchming<	APPROPRIATION/BUDGET ACTIV	<u>}</u>	PROGRAM	ELEMENT			PROJECT NA	AME AND NUM	BER				
Categoriese Information of Contract Performing Information of Contract Performation of Contract Performation (Cost of Marcial Annual Development) Cost of Cost	RDT&E, N		Submarin	ne Tactical Wa	'arfare Syste	ems/P.E. 06	Submarine St	secial Operation	1s Support De	velopment/V1	739		
rot to WBS, of System/lem Method Activity & Activity & Py s Py s Fy 9 Py s Award liferenesh (Cost Fy 10 Date Cost Date Cost to 0000 Total Cost Cost to 0000 Cost to 0000 Total Cost to 0000 Cost to 0000	Cost Categories	Contract				FY 99		FY 00		FY 01			
any Hardware Development and Hardware Development and Hardware Developmen	(Tailor to WBS, or System/Item	Method	Activity &		FY 99	Award			FY 01	Award	Cost to	Total	Target Value
any LatiOvation Development MCR NS/VC Carderock 1,300 0,170 11/98 0,200 11/99 0,000 marks: Tisse Egylmeeting MCR NS/VC Carderock 1,300 0,170 11/98 0,200 11/99 1,500 modical Product Development 1,300 0,170 0,200 0,000 1,670 marks: 1,300 0,170 0,200 0,000 0,000 marks: 1,300 0,170 0,000 0,000 0,000 marks: 1,300 0,170 </td <td>Requirements)</td> <td>& Type</td> <td>Location</td> <td></td> <td>Cost</td> <td>Date</td> <td></td> <td></td> <td>Cost</td> <td>Date</td> <td>Complete</td> <td>Cost</td> <td>of Contract</td>	Requirements)	& Type	Location		Cost	Date			Cost	Date	Complete	Cost	of Contract
Listy Hardware Development WR NSWC Carderock 1,300 0,170 11/99 C	Primary Hardware Development												
ems Engineering WR NSWC Carderock 1,300 0,170 11/98 0,200 11/99 naces naces 1,300 0,170 0,170 0,000 0,000 0,000 d Fees total Product Development 1,300 0,170 0,000 0,000 0,000 0,000 marks: ing Development and Development and English Support 0,000	Ancillary Hardware Development											0.000	
Compact Comp	Systems Engineering	WR	NSWC Carderock	1.300	0.170	11/98	0.200	11/99				1.670	
19g 19g <td>Licenses</td> <td></td> <td>0.000</td> <td></td>	Licenses											0.000	
of Fees 1,300 0,170 0,200 0,000 <	Tooling											0.000	
d Fees 1,300 0,170 0,200 0,000 <t< td=""><td>GFE</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0.000</td><td></td></t<>	GFE											0.000	
marks: marks: 1,300 0,170 0,200 0,000 <	Award Fees											0.000	
marks: iopment Support Equipment 6 <td< td=""><td>Subtotal Product Development</td><td></td><td></td><td>1.300</td><td>0.170</td><td></td><td>0.200</td><td></td><td>0.000</td><td></td><td>0000</td><td>1.670</td><td></td></td<>	Subtotal Product Development			1.300	0.170		0.200		0.000		0000	1.670	
A contact Support Equipment	Remarks:												
rare Development Figure Development Figuration Management Figuration Management Figuration Management Figure Support Figure Suppo	Development Support Equipment											0.000	
ing Development Ing Development Included Support Included Support <td>Software Development</td> <td>_</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0.000</td> <td></td>	Software Development	_										0.000	
rated Logistics Support Fragilities Support Company	Training Development											0.000	
Iguration Management Propertion Management	Integrated Logistics Support			_								0.000	
nical Data 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Configuration Management	-										0.000	
total Support 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Technical Data											0.000	
0.000 0.000 0.000 0.000	GFE											0.000	
	Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	

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Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 11 of 12)

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Exhibit R-3 Cost Analysis (page 2)	le 2)							DAIE:		February 2000	00	-
APPROPRIATION/BUDGET ACTIVITY	Ł	PROGRAM ELEMENT	ENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E, N		Submarine Tactical	-	are Systems	s/P.E. 0603	Warfare Systems/P.E. 06035 Submarine Special Operations Support Development/V1739	ecial Operation	s Support De	velopment/V17	39		
Cost Categories (Tailor to WBS, or System/Item		Performing Activity &		FY 99	FY 99 Award	FY 00	FY 00 Award	FY 01	FY 01 Award	Cost to	Total	Target Value
Requirements)	& Type							Cost	Date	Complete		of Contract
Developmental Test & Evaluation	WR	/RON Five	700	725	98	328	11/99	1.734	11/00	Cont.	12.087	Cont.
Developmental Test & Evaluation	W.	CMDR 3rd NAVCON BRIGATE	0.050	0.050	10/98	0.050	10/99	0.050	10/00	Cont	Cont	Cont.
Operational Test & Evaluation											0.000	
Tooling											0000	
GFE											0.000	
Subtotal T&E			6.750	1.775		1.978		1.784		0.000	12.287	
Remarks:											0000	
Contractor Engineering Support											0000	
Government Engineering Support				2700	44/09	0.437	11/00	960 0		ţ	0.000	Sort
Program Management Support				0.042	10/98	0.010	10/99	0.010		Cont	0.030	Cont
shor (Deceamh Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.052		0.147		0.106		0.000	0.305	
Remarks:												
Total Cost		1	6.750	1.997		2.325		1.890				
Remarks:												
			R-1 SHOP	R-1 SHOPPING LIST - Item No.	- Item No.	48			Exhibit	Exhibit R-3. Project Cost Analysis	st Analysis	

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 12 of 12)

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EXHIBIT R-2, RDT&E Budget Item Justification	RDT&E Budge	t Item Ju	nstification				DATE:			
								Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE	MENCLATURE				
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/	ON, NAVY/4				SHIP CON	SEPT ADVA	SHIP CONCEPT ADVANCED DESIGN, PE 0603563N	IGN, PE 06(03563N	
COST (\$ in Millions	G	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost		9.613	28.659	0.162	2.968	3.892	3.844	3.843	Continuing	Continuing
DESIGN TOOLS, PLANS & CONCEPTS / S2196	6	9.613	5.290	0.162	2.968	3.892	3.844	3.843	Continuing	Continuing
SMART PROPULSOR PRODUCT MODEL / S2757		0.000	1.492	0.000	0.000	0.000	0.000	0.000	0.000	1.492
STANDARDS FOR EXCHANGE OF PRODUCT MODEL DATA / S2758		0.000	1.989	0.000	0.000	0.000	0.000	0.000	0.000	1.989
TRIDENT SSGN CONVERSION / F2759		0.000	9.944	0.000	0.000	0.000	0.000	0.000	0.000	9.944
AUTOMATED MAINTENANCE ENVIRONMENT / 22760		0.000	9.944	0.000	0.000	0.000	0.000	0.000	0.000	9.944
Quantity of RDT&E Articles		A/N	ĄX	Α'N	N/A	ΑΊΝ	A/N	N/A		
A (11) Mission Description and Budget Item Instiffication:				-						

A. (U) Mission Description and Budget Item Justification:

The efforts within this PE directly support the Navy's ability to design more affordable mission capable ships with reduced manning, increased producibility, reduced operating and support costs, and greater utilization of the latest technology. The program directly supports the Navy Shipbuilding Plan with state-of-the-art design tools and methods for ship concept studies, and the actual conduct of design concept studies for the ships in that plan. The program provides the foundation for affordable surface ship design, construction, and life cycle support and is a required first step in the integration of total ship systems, including combat systems and hull, mechanical and electrical (HM&E) systems.

- (U) Project S2196 This project funds pre-milestone 0 ship concept studies, ship and ship systems technology assessments, and the developmentand upgrade of ship design and engineering tools, methods, and criteria including computer aided tools and simulation based ship design and engineering.
- (U) Project S2757 This project develops a smart propulsor product modeling capability. (Congressional add)
- (U) Project S2758 This project develops Standards for Exchange of Product Model Data (STEP development Navy CAE Technology). (Congressional add)
- (U) Project F2759 This project funds TRIDENT SSGN design conversion efforts in FY 2000. PE 0604564N / S2610 funded FY 1999 efforts. FY 2001 efforts are planned for funding in PE 0603559N / S2413. (Congressional add)
- (U) Project 22760 This project funds development of an Automated Maintenance Environment for surface ships. (Congressional add)

R-1 SHOPPING LIST - Item No. 49 -1 of 49 - 9

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 9)

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EXHIBIT R-2, RDT&E Budget Item Justification			DATE:	
				February 2000
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM	R-1 ITEM NOMENCLATURE		
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/4	SHIP CO	SHIP CONCEPT ADVANCED DESIGN, PE 0603563N	NCED DESIGN	, PE 0603563N
b. Program Change Summary:	FY 1999	FY 2000		FY 2001
FY 2000 President's Budget:	7.077	5.318		5.675
Appropriated Value:	7.077	28.818		
Adjustment to FY 1999/2000 Appropriated Value/				
FY 2000 President's Budget:	2.536	-0.159		-5.513
FY 2001 PRES Budget Submit:	9.613	28.659		0.162

(U) Funding: FY 1999 funding changes reflects increases of \$2.926M for LHA Development Options Study (DOS) and JCC(X) ship versus shore basis mission needs analysis, and reductions of \$-0.228M to design tools, \$-0.121M for SBIR, \$-0.008M for FY 1999 Federal Technology Transfer, and -\$0.033M Inflation Adjustment.

FY 2000 funding change is: -\$0.159M congressional across the board reductions. -\$0.951M execution adjustment, -\$1.270M reallocation of funding to Advanced Undersea Warfare Concept FY 2001 funding decrease is due to: -\$3.200M to design tools for highrer priority programs, -\$0.951M execution adjustment, -\$1.270M reallocation of funding to Advanced Undersea Warfare Concept development, and-\$0.092M minor adjustment.

(U) Schedule: LHA Replacement MS 0 was delayed pending results of the LHA DOS.

(U) Technical: Cost modeling and analysis capabilities and Reliability Based Structural Design Criteria will be stopped at the end of FY 00. However, the results will be available for each ship acquisition program to individually implement and further develop these life cycle cost models and tools for CAIV analysis. Each on-going and future ship acquisition program individually will plan for and develop their needed tools and methods for ship design and engineering.

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Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 2 of 9)

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EXHIBIT	EXHIBIT R-2a, RDT&E	: Project Justification	stification				DATE:			
								Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	EMENT NAM	E AND NUMB	ER	PROJECT NA	PROJECT NAME AND NUMBER	IBER			
RDT&E,N/4	SHIP CONCEPT		D DESIGN, PE	≣ 0603563N	ADVANCED DESIGN, PE 0603563N DESIGN TOOLS, PLANS & CONCEPTS / S2196	LS, PLANS &	CONCEPTS /	S2196		
COST (\$ in Millions		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost (S2196)		9.613	5.290	0.162	2.968	3.892	3.844	3.843	Continuing	Continuing
RDT&E Articles Qty										

considered and our greatest potential ship design advances never realized. Designs and technologies must meet the threat. This project supports this requirement. Computer modeling and simulation in down-stream design/construction and operational problems. A more subtle and severely negative impact of neglecting this early effort is that the "best" concepts and technologies may never even be A. (U) Mission Description and Budget Item Justification: The efforts within this project directly support the Navy's ability to design more affordable mission capable ships with reduced manning, increased producibility, reduced operating and support costs, and greater utilization of the latest technology. This project directly supports the Navy Shipbuilding Plan with state-of-the-art design tools and methods for concept studies, and the actual conduct of design concept studies for the ships in that plan. This project provides the foundation for affordable surface ship design, construction, and life cycle support and is a required first step in the integration of total ship systems, including combat systems and hull, mechanical and electrical (HM&E) systems. Inadequate early planning and ship concept formulation can result developments will permit virtual operation and evaluation of the ship and enable reduction of ship production and support cost by allowing fleet representatives, shipbuilders and maintenance staffs to build, test, operate or repair the ship "in the computer" at a design stage where the design is flexible and where feedback and suggested changes can be incorporated relatively easily.

- (U) This project accomplishes the following: (1) identifies future surface ship requirements and characteristics necessary to meet future threats and support mission needs; (2) investigates new affordable ship concepts and evaluates technologies necessary to support these concepts; (3) provides design methods and automated design tools to develop and evaluate ship concepts, support early ship design, and solve pressing fleet engineering problems; (4) develops design criteria and common standards to improve affordability; (5) improves the quality of the product in the design phases, to reduce or eliminate the costs of fixing problems after ships reach the fleet; (6) develops investment strategies for new concepts and technologies; (7) and supports development of Mission Need Statements (MNS) for future ships.
- (U) Efforts under Project S2196 transition directly to early stage ship design in PE 0603564N, Ship Preliminary Design and Feasibility Studies. While these efforts support all surface ship acquisition programs, they are not direct efforts for specific authorized shipbuilding programs. This project is the only R&D effort (Government or commercial) that supports and maintains this country's naval ship design and engineering capabilities in the area of early stage (Concept through Contract Design) design tools, criteria, and methods.
- (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
- 1. (U) FY 1999 ACCOMPLISHMENTS:
- (U) (\$4.243) Pre-Milestone 0 Ship Concepts and Mission Need Analysis: Developed ship concepts and performed mission area analysis (MAA) for potential ships 5-10 years out in the SCN plan, including ship size, configuration, capabilities and rough order of magnitude (ROM) ship costs. Conducted pre-Milestone 0 ship concept studies for joint command ship, medical capabilities afloat, and alternative potential ship concepts in support of SCN planning. Conducted joint command ship (JCC(X)) ship versus shore basis mission needs analysis. Conducted Development Options Study for LHA replacement (large deck amphibious assault ship) including ship concept studies. Developed future surface warfare vision including mission needs and concepts, and technology needs and plans.

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 3 of 9)

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	DATE:
		February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E,N/4	SHIP CONCEPT ADVANCED DESIGN, PE 0603563N DESIGN TOOLS, PLANS & CONCEPTS / S2196	DESIGN TOOLS, PLANS & CONCEPTS / S2196

- (U) (\$0.464) Total Ship Technology Assessment: Analyzed the benefits and impacts of new ship and hull, mechanical and electrical (HM&E) concepts and technologies. Developed a process to identify, characterize and assess new and emergent technologies and updated the HM&E technology database. Supported integration and transition of new technologies in total ship concepts. Established baseline ship concepts and technology characterization process for use in technology assessments.
- to handle new ship configurations, hull form alternatives, signature reduction features, addressed minimum required shipboard manning, reduced construction cost, and increased capabilities to determine ship (U) (\$1.344) Ship Design and Engineering Tools, Methods, and Criteria: Developed and improved early stage ship design methods, criteria, standards, and data bases. Improved surface ship synthesis/assessment models in the following areas: improved performance assessment capabilities, completed link to commercial CAD II system, increased ability to handle alternative distributed system estine thitectures, linked to industry STEP data exchange protocols, began efforts to link with operational effectiveness models, updated and enhanced capabilities to support on-going future surface ship designs computer aided design methods and tools for early stage ship design in the following areas: completed development and integration of structural analysis tools with CAD II system, upgraded manning estimation tools, enhanced machinery design tools, completed general arrangements tool upgrades, and integrated distributed systems analysis software with CAD II system. Supported Navy Industry Digital impacts of new technologies. Improved ship cost estimating capabilities: linked new acquisition cost modeling capability to ship synthesis/assessment models. Supported development of advanced Specification Committee (NIDDESC) development of STEP computer aided design (CAD) systems data and parts library exchange protocol standards for shipbuilding industry.
- visualizationand simulation tools from all sources, including DARPA, ONR, and other government activities for areas such as ship motions, maneuvering, powering, personnel flow, stores flow, structural source visualizationand simulation tools for the areas of: fluid / piping systems simulation, and crew reduction performance simulation. Developed custom visualizationand simulation tools where no alternate (U) (\$1.375) Simulation Based Ship Design and Engineering: Broad-based implementation of state-of-the-art visualizationand simulation techniques for ship design and engineering applications. Integrated response, command and communications systems, electric power systems, piping systems, HVAC systems, and combat systems. Acquired and validated, adapted, and implemented commercial and other source exists in the following areas: signature visualizationand simulation. Completed development of standard "wrapper" program to integrate visualizationand simulation tool with legacy computer aided design and physics-based hull, mechanical and electrical (HM&E) analysis tools. Developed capabilities for realistic, physics-based simulation of ship performance, behavior, and response in the following areas; survivability, damage tolerance, and damaged mission capability simulation by developing an integrated survivability assessment and analysis capability.
- (U) (\$1.175) Reliability Based Structural Design Criteria: Added new reliability inputs and assessment techniques to design rules. Incorporated methods for predicting extreme and cumulative lifetime loads design rules. Collected and analyzed long-term hydrodynamic loads data. Correlated full scale loads measurements with model test results. Validated and adapted advanced seaway loads prediction methods resistance factor design (LRFD) structural rules for naval surface ships. Validated processes and utilized technologies/improved design methods on existing ships and new designs. Supported transition to for use with design rules. Developed methodology for bow form effects on hull loads. Established safety indices for naval ship structures for hull girders. Performed large scale grillage strength tests. Began assessment of grillage strength test data. Updated design data sheet for compressive strength of plating stiffeners and grillages. Developed structural fatigue (part IV) of the reliability-based load and industry through Ship Structure Committee (SSC).

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 4 of 9)

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	DATE:
		February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E,N/4	SHIP CONCEPT ADVANCED DESIGN, PE 0603563N DESIGN TOOLS, PLANS & CONCEPTS / S2196	DESIGN TOOLS, PLANS & CONCEPTS / S2196

(U) (\$1.012) Total Ownership Cost Methods and Modeling: Developed total ownership cost modeling and cost decision making tools for ships. Supported Navy-ShipbuildingIndustry cost model development team. Validated the prototype Product Oriented Design and Construction (PODAC) cost model at two or more additional shipyards. Developed plan for PODAC cost model extensions for combat systems and C4I costs. Collected and analyzed cost data of shipbuilders for development of activity cost factors for naval ships. Developed PODAC cost model estimating ratios for shipbuilding interim products, parametric scaleable systems, and shipboard equipment for ships. Developed a plan for risk and schedule capabilities to PODAC cost model. Used PODAC cost model to analyze new technologies to validate model capabilities to correctly reflect acquisition cost impacts. Began execution of plan to adapt and integrate an existing ship operating and support (O&S) cost module with the PODAC cost model. Linked O&S cost analysis methodology with product work break down of PODAC cost model. Developed a link between PODAC and computer aided ship design tools, so that cost-related information produced by these design tools can be readily imported into the cost model. Supported cost modeling and cost analysis for on-going ship programs.

(U) Note: Affordability Through Commonality (ATC) program efforts previously under this PE/Project are shown in PE 0603513N, Project 32469. The FY 1999 funds for ATC were budgeted under this PE/Project as displayed in the FY 1999 President's Budget but transitioned to PE 0603513N / Project 32469 for execution. ATC funding for both budget and execution in FY 2000 and out-years has transferred to PE 0603513N, Project 32469.

3. (U) FY 2000 PLAN:

(U) (\$0.530) Pre-Milestone 0 Ship Concepts and Mission Need Analysis: Develop ship concepts and perform mission area analysis (MAA) for potential ships 5-10 years out in the SCN plan, including ship s configuration, capabilities and rough order of magnitude (ROM) ship costs. Conduct pre-Milestone 0 ship concept studies for medical capabilities and rough order of magnitude (ROM) ship costs. Conduct pre-Milestone 0 ship concept studies for medical capabilities and rough order of magnitude (ROM) ship costs. ship concepts / configurations in support of SCN planning. Develop potential future fleet architecture concepts. (U) (\$0.395) Total Ship Technology Assessment: Analyze the benefits and impacts of new ship and hull, mechanical & electrical (HM&E) concepts and technologies. Identify, characterize and assess new and emergent technologies and update the HM&E technology database. Support integration and transition of new technologies in total ship concepts. Update baseline ship concepts and technology attribute database for use in technology assessments. Support development of total ship and HM&E technology roadmaps. (U) (\$1.250) Ship Design and Engineering Tools, Methods, and Criteria. Improve capability for rapid and accurate ship performance/cost/risk assessments and tradeoff studies. Improve surface ship synthesis/assessment models in the following areas: improve performance assessment capabilities, increase ability to handle alternative distributed system architectures, update and enhance capabilities to and increased capabilities to determine ship size impacts of new technologies. Improve interoperability of Navy and shipbuilder design systems. Continue development of interoperability standards and capability between and among: synthesis/assessment models, cost estimation models, operational effectiveness models, shipbuilder computer aided design (CAD) models, and Navy-developed analysis tools by handle new ship configurations, hulf form alternatives, signature reduction features, characterize advanced machinery technologies, address minimum required shipboard manning, reduced construction cost, participation in and support for collaborative efforts such as the Navy Industry Digital Data Exchange Standards Committee (NIDDESC) and the Maritech Advanced Shipbuilding Enterprise (ASE)

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 5 of 9)

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APPROPRIATION/BUDGET ACTIVITY PROGRAM ELEMENT NAME AND NUMBER PROJECT NAME AND NUMBER SHIP CONCEPT ADVANCED DESIGN, PE 0603563N DESIGN TOOLS, PLANS & CONCEPTS / S2196	EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	DATE:
ON/BUDGET ACTIVITY			February 2000
	APPROPRIATION/BUDGET ACTIVITY		PROJECT NAME AND NUMBER
	RDT&E,N/4	SHIP CONCEPT ADVANCED DESIGN, PE 0603563N	DESIGN TOOLS, PLANS & CONCEPTS / S2196

design needs and ship technology developments to identify top priority simulation requirements. Acquire, validate, adapt, and implement commercial visualizationand simulation tools for the areas such as areas such as ship motions, maneuvering, powering, personnel flow, stores flow, structural response, command and communications systems, electric power systems, piping systems, HVAC systems, and combat systems. Develop custom visualizationand simulation tools where no alternate source exists in areas such as signature visualizationand simulation. Continue development of interoperability standards (U) (\$1.200) Simulation Based Ship Design & Engineering: Continue to adapt state-of-the-art visualization and simulation techniques for ship design and engineering applications. Review pending ship piping systems simulation and ergonomic models in crew reduction performance simulation. Validate and implement visualizationand simulation tools from DARPA, ONR, and other government sources for and capability between visualization and simulation tools, ship synthesis/assessment models and computer aided design (CAD) models.

components (unstiffened and stiffened plates). Continue performing large scale grillage strength tests. Assessment of grillage strength test and grillages trength test data. Update design data sheet for compressive strength of plating stiffeners and grillages. Begin integration of all four parts of the reliability-based load and resistance factor design (LRFD) structural rules for naval surface ships. Validate processes and utilize rules. Incorporate methods for predicting extreme and cumulative lifetime loads into design rules. Collect and analyze long-term hydrodynamic loads data. Correlate full scale loads measurements with model test results. Validate and adapt advanced seaway loads prediction methods for use with design rules. Develop methodology for bow form effects on hull loads. Establish safety indices for naval ship structures (U) (\$0.970) Reliability Based Structural Design Criteria: Begin development of methodology for overall strength analysis of surface ships. Add new reliability inputs and assessment techniques to design technologies/improved design methods on existing ships and new designs. Support transition to industry through the Ship Structure Committee (SSC)

(U) (\$0.945) Total Ownership Cost Methods and Modeling: Develop total ownership cost modeling and cost decision making tools for ships. Support Navy-Shipbuilding Industry cost model development leam. Enhance the PODAC cost model capability to incorporate separately estimated cost for specific or special systems. Execute development plan for risk and schedule capabilities of PODAC cost model. Collect and analyze cost data of shipbuilders for development of activity based cost estimation factors. Continue to develop PODAC cost model estimating ratios for shipbuilding interim products, parametric scaleable systems, and shipboard equipment for ships. Develop cost estimation ratios for world class shipbuilding processes and practices and for new ship production processes, technologies, and materi Continue integration of operating and support (O&S) cost modeling and analysis capabilities. Develop O&S cost estimating ratios for naval ships through analysis of Visibility And Management of Operating and Support Costs (VAMOSC) and other historical O&S databases. Continue work on design data analysis module to link PODAC with computer-aided ship design tools.

(U) FY 2001 PLAN:

(U) (\$0.162) Ship Design and Engineering Tools, Methods, & Criteria. Improve capability for rapid and accurate ship tradeoff studies using surface ship synthesis/assessment models.

B. Other Program Funding Summary: Not applicable.

(U) Related RDT&E

(U) PE 0602121N (Surface Ship Technology)
(U) PE 0603513N (Shipboard Systems Component Development)
(U) PE 0603564N (Ship Preliminary Design and Feasibility Studies)

(U) PE 0603512N (Carrier Systems Development)
(U) PE 0604300N (SC21 Total Ship Systems Engineering)
(U) PE 0604567N (Ship Contract Design/Live Fire T&E)

C. Acquisition Strategy:
This is a non acquisition program that develops, demonstrates, evaluates, and validates early stage total ship concepts, tools, methods, and criteria that are used by on-going and future ship acquisition programs. This program also supports development, demonstration, evaluation, and validation of engineering tools, methods, and criteria for ship life cycle engineering work.

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Exhibit R-2a, RDT&E Project Justification

(Exhibit R-2a, page 6 of 9)

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E.N/4	PROGRAM ELEMENT NAME AND NUMBER SHIP CONCEPT ADVANCED DESIGN, PE 0603563N	ER PROJECT NAME AND NUMBER 0603563N DESIGN TOOLS, PLANS & CONCEPTS / S2196	
D. Schedule Profile		1	
	FY 1999	FY 2000	FY 2001
Program Milestones	(Not applicable - Non-Acquisition Program)		
Engineering Milestones (All are 4th Quarter unless otherwise indicated)	Complete command ship JCC(X) concept studies	Complete Medical Capability Afloat Study	
		Complete LHA (large deck amphibious assault) Dev. Options Study including ship concept studies 1Q	
	Complete ship synthesis model tool (ASSET) to cost model Interface	Complete ship synthesis model tool interface to major operational assessment tool	
	Simulation of distributed fluid systems behavior	Complete ship synthesis model tool user interface upgrade	
	Standardize interface mechanism (eg, STEP, COM) for design tool interoperability	Publication of interface specifications for 20 analysis programs	
	Structural fatigue LRFD structural rules	Fracture & grillage tests of shipyard fabrication specimens complete	
	Establish safety indices for naval ship structures for hull girders	Safety indices for naval ship structures components (unstiffened and stiffened plates)	
	PODAC cost model validation complete at 2 additional shipyards	Demonstration of Initial Life Cycle cost estimating capabilities	
	PODAC Cost Model Version 1	PODAC Cost Model Version 2	
Testing Milestones	(Not applicable - Non-Acquisition Program)		
Contract Milestones	(Not applicable - Non-Acquisition Program)		
	FOLICING	0 073 1 07 14 11	

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 7 of 9)

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								DATE:				
Exhibit R-3 Cost Analysis (page 1)	e 1)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	ΙΙ	PROGRAM ELEN	I ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E,N/4		SHIP CONCEPT		ADVANCED DESIGN, PE 0603563N	E 0603563N	DESIGN TOO	DESIGN TOOLS, PLANS, AND CONCEPTS, S2196	VD CONCEPT	S, S2196			
Cost Categories	Contract	Contract Performing	Total		FY 99				FY 01			
(Tailor to WBS, or System/Item	Method	Method Activity &	PΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost	Cost	Date	Cost			Date	Complete	Cost	of Contract
Primary Hardware Development											0.000	
Ancillary Hardware Development											0.000	
Systems Engineering,	C/CPFF	C/CPFF Nichols Adv Marine (NAM)	900:9	1.788	Note (1)	0.200	Note (1)	0.000	Note (1)	Cont.	Cont.	N/A
Concept Development,		Arlington, VA										
Engineering Development,	C/CPFF		0.700	0.750	Note (2)	0.600	Note (2)			Cont.	Cont.	ΥX
Demonstration & Evaluation		MD Note(2)	-									
	various	Other Contractors	42.104	1.462	various	0.260	various	0.000	varions	ΑN N	Α'X	Ϋ́
	WR	NSWC/Carderock Div,	19.374	4.291	Ϋ́	3.830	Ϋ́χ	0.160	Ϋ́Z	A/N	Y/X	ΑΝ
		West Bethesda, MD								,,,,,,		
	WR&	Other Govt. Activities	6.593	1.319	Ą X	0.390	ĕ.	0.000	Ą Z	K/N	A/N	ΑX
	MIPR											
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal Product Development			73.777	9.610		5.280		0.160		Cont.	Cont.	

Remarks: Note (1): Existing Contract awarded April 1995. Modifications award 1st quarter of FY.

Note (2): Existing Contract awarded March 1998. Modifications award 1st quarter of FY. This contract also includes Avondale Industries, New Orleans, LA; Bath Irons Works, Bath, ME;

Ingalls Shipbuilding, Pascagoula, MS; NASSCO, San Diego, CA; Designers & Planners, Arlington, VA; and The University of Michigan Transportation Research Institute, Ann Arbor, MI

					-		*****	
Development Support Equipment							0.000	
Software Development							0.000	
Training Development							0.000	
Integrated Logistics Support							0.000	
Configuration Management							0.000	
Technical Data							0.000	
GFE							0.000	
Subtotal Support	000'0	00000	0000	0	0.000	N/A	N/A	

Remarks:

R-1 SHOPPING LIST - Item No. 49 - 8 of 49 - 9

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 8 of 9)

UNCLASSIFIED

								DATE:				
Exhibit R-3 Cost Analysis (page 2)) 2)									February 2000	00	•
APPROPRIATION/BUDGET ACTIVI	ΤY	PROGF	PROGRAM ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E,N/4		SHIPC	SHIP CONCEPT ADVANCED DESIGN, PE 0603563N	ED DESIGN, P	E 0603563N	DESIGN TOO	DESIGN TOOLS, PLANS, AND CONCEPTS, S2196	ND CONCEPT	S, S2196			
Cost Categories		0	Total	,	FY 99				FY 01			
(Tailor to WBS, or System/Item Requirements)	Method /	Activity &	PY s	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Test & Evaluation	1									Southern	0.00	100
Operational Test & Evaluation											0.000	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			0000	0.000	N/A	0.000	N/A	0.000	A/A	N/A	N/A	
Remarks:												
Contractor Engineering Support											A/N	
Government Engineering Support											N/A	
Program Management Support											A/N	
Travel				0.003		0.010		0.002		Cont.	Cont.	
Labor (Research Personnel)											A/A	
Overhead											N/A	
Subtotal Management			0.000	0.003		0.010		0.002		Cont.	Cont.	
Remarks:												
Total Cost			73.777	9.613		5.290		0.162		Cont.	Cont.	
Remarks:												

R-1 SHOPPING LIST - Item No. 49 - 9 of 49 - 9

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 9 of 9)

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification	RDT&E Budget	t Item Ju	stification				DATE:	Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE	MENCLATURE				
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/4	ON, NAVY/4				0603564N - SI	nip Preliminary	0603564N - Ship Preliminary Design and Feasibility Studies	easibility Stud	es	
COST (\$ in Millions	4	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	6.	6.706	11.945	46.896	4.944	0.000	0.000	0.000	Continuing	Continuing
Ship Feasibility Studies/S0408	0.	0.000	11.945	46.896	4.944	0.000	0.000	0.000	Continuing	Continuing
ADC(X) Auxiliary Cargo Ship Development/S2609	5.	5.738	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.738
SSBN To SSGN Analysis/S2610	0	0.968	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.968
Quantity of RDT&E Articles		A/A	N/A	N/A	N/A	N/A	N/A	N/A		

A. Mission Description and Budget Item Justification

(U) The primary objective of Ship Preliminary Design and Feasibility Studies is to design more capable warships at reduced cost, with reduced manning and increased producibility, utilizing the latest technologies and ship/system design methodologies. Modern day ship design and acquisition processes do not separate Preliminary and Contract Design. These are seamless design actions conducted between MS I and II.
Therefore after FY 1996, design activities formerly conducted in this Program Element (P.E.) as Preliminary Design were combined under P.E. 0604567N, Ship Contract Design/Live Fire Test and Evaluation. This program directly supports the Navy Shipbuilding Plan by performing ship Feasibility Studies. (U) Project S0408 – Ship Development (Advanced), supports post Milestone 0 ship Feasibility Studies that provide the technical definition and initial cost estimates for various ship alternatives being considered in the Analysis of Alternatives (AOA). This project develops the primary supporting documentation for Milestone I decisions. This project also develops and upgrades the engineering tools, especially ship synthesis models, used to support AOA studies and the other engineering efforts accomplished during Phase 0, between Milestones 0 and I.

(U) Project S2609 – This program provides Auxiliary Dry Cargo (ADC(X)) Feasibility Studies and Analysis of Alternatives (AOA) support.

(U) Project S2610 - This program is funded to analyze the feasibility of converting some Trident SSBNs to the SSGN configuration.

Note: In accordance with 15 USC 638, \$.125M in FY 2000 is reserved for the Small Business Innovation Research (SBIR) assessment.

R-1 SHOPPING LIST - Item No. 50-1 of 50-6

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 6)

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EXHIBIT R-2, RDT&E Budget Item Justification		DATE:		Г
			February 2000	
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	MENCLATURE		
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/4	0603564N - Sh	0603564N - Ship Preliminary Design and Feasibility Studies	d Feasibility Studies	
B. Program Change Summary				
	FY 1999	FY 2000	FY 2001	
FY 2000 President's Budget:	2.023	12.012	17.000	
Appropriated Value:	2.023	12.012		
Adjustment to FY 1999/2000 Appropriated Value/ FY 2000 President's Budget:	4.683	-0.067	29.896	
FY 2001 PRES Budget Submit:	6.706	11.945	46.896	
FY 1999 Changes consist of: +\$5.928M FY 99 Congl Transfer: ADC(X), +\$1.000M FY 99 Congl Add: SSGN Study, -\$1.962M March 1999 DD 1002 Update (BTR to S2196), -\$0.220M FY-99 SBIR/STTR Transfer, -\$0.063M minor pricing adjustments.	: SSGN Study, -\$1.962M	March 1999 DD 1002 Up	date (BTR to S2196), -\$0.220M FY-99	
FY 2000 Changes consist of: -\$0.067M Across-the Board Reduction.				

FY 2001 Changes consist of: +\$15.200M JCC(X)., +\$16.000M LHA Replacement AOA, -\$1.0M to finance higher priority requirements ,-\$0.304M for NWCF rate and other pricing adjustments.

Schedule: Not applicable.

Technical: Not applicable.

R-1 SHOPPING LIST - Item No. 50-2 of 50-6

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 2 of 6)

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E	E Project Justification	tification				DATE:			
								Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELE	LEMENT NAM	EMENT NAME AND NUMBER	ER.	PROJECT NA	PROJECT NAME AND NUMBER	BER			
RDT&E,N/4	Ship Prelim D	Ship Prelim Design & Feasibility Studies/0603564N	ility Studies/06		Ship Development (ADV)/S0408	nent (ADV)/S0	408			
COST (\$ in Millions		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost (S0408)		0.000	11.945	46.896	4.994	0.000	0.000	0.000	Continuing Continuing	Continuing
RDT&E Articles Qty										

new surface ships in the Navy Shipbuilding Plan; performs impact studies of warfare, hull, mechanical and electrical subsystems on advanced ship designs; enhances ship/ship system design methodologies that support phase 0; develops and upgrades the engineering tools, especially ship synthesis models, used to support AOA studies and other engineering efforts accomplished during phase 0; evaluates A. (U) Mission Description and Budget Item Justification. Ship concepts, identified in PE 0603563N (Ship Concept Advanced Design) are transitioned to and further developed by this project after an approved advanced and alternative technologies and develops total ship concepts with these technologies to assess their suitability; develops the initial documentation and design methodology required by the government for the design of surface ships in the Shipbuilding Program in accordance with the requirements of the DoD 5000 directives/instructions; supports the development of the Operational Requirements Document (ORD) and other documentation required at Milestone I; and accomplishes other efforts for future ship acquisitions in support of a Milestone I decision. Completion of this phase allows review and approval, at Milestone I, to transfer a ship program to the Contract Design Program Element 0604567N. Ship Feasibility Study products include a description of the alternative ships' principal characteristics and mission critical subsystems, weight estimates, general arrangement sketches, technical risk assessments, and Class F cost estimates. The objective is to provide the decision makers with feasible, affordable Milestone 0 (MS 0) decision. This project performs the Ship Feasibility Studies required after MS 0 to address a specific Mission Needs Statement (MNS) and supports the Analysis of Alternatives(AOA) for afternatives.

- (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
- 1. (U) FY 1999 ACCOMPLISHMENTS:
- (U) (\$ 0.000) No funding.
- 2. (U) FY 2000 PLAN:
- (U) (\$11.945) Pre-Milestone I AOA, ORD development and supporting feasibility studies for a new Joint Command and Control (JCC(X\$hips.
- 3. (U) FY 2001 PLAN:
- (U) (\$30.896) Continue and complete JCC(X) FeasibilityStudies, AOA, and ORD development. Prepare documentation required for a Milestone I decision. Develop and upgrade engineering tools, especially ship synthesis models, that support this AOA study and the other engineering efforts accomplished during Phase 0, between Milestones 0 and I.
- (U) (\$16,000) Begin pre-Milestone I AOA, feasibility studies, and ORD Development for LHA Replacement ships. Develop and upgrade engineering tools, especially ship synthesis models, that support this AOA study and the other engineering efforts accomplished during Phase 0, between Milestones 0 and

R-1 SHOPPING LIST - Item No. 50-3 of 50-6

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 3 of 6)

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EXHIBIT	EXHIBIT K-2a, KDT&E Project Justification			DAIE:	February 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/4	PROGRAM ELEMENT NAME AND NUMBER Ship Prelim Design & Feasibility Studies/0603564N	564N	PROJECT NAME AND NUMBER Ship Development (ADV)/S0408	3ER 08	
B. (U) Other Program Funding Summary: Not applicable.	1				
(U) Related RDT&E: (U) PE 0603563N (Ship Concept Advanced Design) (U) PE 0604567N (Ship Contract Design/Live Fire T&E) (U) PE 0604300N (SC21 Total Ship Systems Engineering)	sign) 'ire T&E) ngineering)				
C. (U) Acquisition Strategy: Not applicable. This is a non acquisition program that supports pre-Milestone I efforts for potential ship acquisition programs.	tone I efforts for potential ship acquisition pro	grams.			
D. (U) Schedule Profile					
FY 1999	FY 2000	FY 2001	FY2002		
Program Milestones	2Q LHA Replacement MS 0	4Q JCC(X) MS I	2Q LHA Replacement MS	MSI	
Engineering Milestones TBD – Milestone schedule is established at MS I.	established at MS I.				
T&E Milestones See individual ship acquisition program documentation.	m documentation.				
Contract Milestones See individual ship acquisition program documentation.	gram documentation.				

R-1 SHOPPING LIST - Item No. 50-4 of 50-6

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 4 of 6)

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Exhibit R-3 Cost Analysis (page 1) APPROPRIATION/BUDGET ACTIVITY RDT &E.N/4 Cost Categories (Tailor to WBS, or System/Item Requirements) Requirements Primary Hardware Development							_		February 2000	<<	
S system/item are Development										8	
s , or System/Item are Development	PROGRAM ELEMENT	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
s , or System/Item are Development	Ship Prelim I	Ship Prelim Design & Feasibility Studies/0603564N	ility Studies/06	03564N	Ship Develop	Ship Development (ADV)/S0408	408				
, or System/Item are Development	Performing	Total		FY 99		FY 00		FY 01			
are Development	Activity &	ΡYs	FY 99	Award	FY 00		FY 01	Award	Cost to	Total	Target Value
are Development	Location			Date	Cost		Cost	Date	Complete		of Contract
										0.000	
Ancillary Hardware Development										0.000	
	NSWC Dahlgren, VA	8.842	000.0		0.000		2.000	Various	Cont.	Cont.	N/A
WR	NSWC Carderock, MD	0.000	0.000		1.000	Various	2.000	Varions	Conf.	Cont.	A/A
WR	NSWC Port Hueneme	0.000	0.000		0.000		1.000	Varions	Cont.	Conf.	ΑX
<u>8</u>	SPAWAR	0.000	0.000		5.882	Varions	9.737	Various	Cont.	Cont.	ΑX
<u>8</u>	NAVAIR	0.000	0.000		0.000		2.000	Various	Cont.	Cont.	ΑX
WR/Regi	WR/Reqn Other Government	10.558	0.000		0.000		0.000		Cont.	Cont.	Ϋ́Z
C/CPFF	Nichols Adv Marine, VA	0.000	0.000		3.500	Varions	4.000	Varions	Conf.	Cont.	A/N
Comp		5.857	0.000		1.512	Various	0.000		Cont.	Cont.	Ϋ́Χ
Various	Other Contractor	16.769	0.000		0.000		21.084	Varions	Cont.	Cont.	Ϋ́Χ
Licenses										0:000	
Tooling										0.000	
GFE										0:000	
Award Fees										0.000	
Subtotal Product Development		42.026	0.000		11.894		46.821		Cont.	Cont.	N/A
!											
Remarks:											
Development Support Equipment										0.000	
Software Development										0.000	
Training Development										0.000	
Integrated Logistics Support										0.000	
Configuration Management										0.000	
Technical Data										0.000	
GFE										0.000	
Subtotal Support		0.000	0.000		0.000		0.000		0.000	0.000	

R-1 SHOPPING LIST - Item No. 50-5 of 50-6

Remarks:

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 5 of 6)

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Exhibit R-3 Cost Analysis (page 2)							i S		February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	PROGE	PROGRAM ELEMENT			PROJECT N	PROJECT NAME AND NUMBER	ABER				
RDT&E,N/4	Ship Pr	Ship Prelim Design & Feasibility Studies/0603564N	bility Studies/06	303564N	Ship Develop	Ship Development (ADV)/S0408	0408				
S Contract	}	Total		FY 99	1	FY 00		FY 01	;	:	1
or System/Item Method	Activity &	PY S	FY 99 Cost	Award	FY 00	Award	Cost	Award	Cost to Complete	Cost	l arget Value of Contract
	LOCALIOIT	1600	1000	200	100	200	100	200	200	0.000	5
Operational Test & Evaluation										0.000	
Tooling										0.000	
GFE										0000	
Subtotal T&E		0000	0.000		0.000		0.000		0.000	0000	
Remarks:											
Contractor Engineering Support			ļ 							0.000	
Government Engineering Support										0.000	
Program Management Support										0.000	
Travel			0.000		0.051		0.075		Cont.	Cont.	ΚX
Labor (Research Personnel)										0.000	
Overhead										0.000	
Subtotal Management		0.000	0.000		0.051		0.075		Cont.	Cont.	A/N
Remarks:											-
Total Cost		42.026	0.000		11.945		46.896		Cont.	Cont.	N/A
Remarks:									-		
		R-1 SHO	R-1 SHOPPING LIST - Item No. 50-6 of 50-6	- Item No.	50-6 of 50-6					•	

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 6 of 6)

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EXHIBIT R.	EXHIBIT R-2, RDT&E Budget Item Justification	ndget Item J	ustification				DATE:	Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE	MENCLATURE	111			
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/	ATION, NAV	//BA-4			0603573N/AD	VANCED SUF	0603573N/ADVANCED SURFACE MACHINERY	NERY		
COST (\$ in Millions	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete	Total Cost
Total PE Cost		29.478	26.581	5.635	8.579	6.426	5.893	0.000	0.000	393.115
Advanced Surface Machinery/S1314		29.478	24.592	5.635	8.579	6.426	5.893	0.000	0.000	391.126
Naval Ship Survivability/32761		0.000	1.989	0.000	0.000	0.000	0.000	0.000	0.000	1.989
Quantity of RDT&E Articles										

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Advanced Surface Machinery (ASM) Programs develop affordable advanced machinery and subsystems for surface ship propulsion, electric and auxiliary requirements.

Project S1314, the ICR Gas Turbine Engine program, is a marine propulsion gas turbine. ICR will reduce life cycle fuel cost and provide an alternate prime mover candidate. A contract for ICR Advanced Development was awarded to Westinghouse Electric Corporation in December 1991. The ICR is derived from the Rolls-Royce RB211 aircraft engine and through the introduction of an intercooler, recuperator, and variable area nozzles achieves approximately a 25% to 27% propulsion annual fuel savings when compared to the LM2500 on a mechanical drive ship.

(U) Project 32761 - The funding will be used to demonstrate advanced open system architectures and controls to further improve electrical power reliability to mission critical loads and further reduce platform costs.

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Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 6)

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EXHIBIT R-2, RDT&E Budget Item Justification		DATE: Fohniary 2000	
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA4	R-1 ITEM NOMENCLATURE 0603573N/ADVANCED SURFACE MACHINERY	FACE MACHINERY	
B. PROGRAM CHANGE:			
FY 1999 FY 2000 President's Budget: 24.344 Appropriated Value: 24.344	99 EY 2000 44 17.727 14 17.727	<u>FY 2001</u> 3.664	
99/2000 Appropriated Value/ get Submit:		1. <u>971</u> 5.635	
FY 1999 Adjustments: Restructure/Adjustment and +3.999M for ICR development testing and 1.135M for various adjustments.	djustments.		
FY 2000 Adjustments: +7.000M for ICR Cost Improvement Program. +1.989M for Naval Ship Survivability Program and -0.135M Across the Board reduction.	n and -0.135M Across the Board	d reduction.	
FY 2001 Adjustment s: +1.971M for various adjustments.			
Schedule: ICR - No change. IPS program transitioned to P.E. 0603513N/Project 32471 in FY 2000.			
Technical: IPS program transitions to P.E. 0603513N/Project 32471 in FY 2000. In FY 2000, the ICR program will transition the qualification portion of program to Allied countries for completion.	transition the qualification portic	on of program to Allied countries for completion.	
	- G- G- G- G- G- G- G- G- G- G- G- G- G-		

R-1 SHOPPING LIST - Item No. 52-2 of 52-7

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 3 of 6)

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	EXHIBIT R-	EXHIBIT R-2a, RDT&E Project Justification	ect Justification				DATE:	Febi	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM EL	PROGRAM ELEMENT NAME	AND NUMBER		PROJECT NA	PROJECT NAME AND NUMBER	BER			
RDT&E, N/BA-4	ADVANCED S	URFACE MACH	ADVANCED SURFACE MACHINERY/PE 0603573N	73N	ICR-Gas Turbi	ICR-Gas Turbine Engine/S1314	14			
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete	Total Cost
Project Cost		29.478	24.592	5.635	8.579	6.426	5.893	0.000	0.000	391.126
RDT&E Articles Qty										

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The ICR Gas Turbine Engine is a marine propulsion gas turbine. ICR will reduce life cycle fuel cost and provide an alternate prime mover candidate. A contract for ICR Advanced Development (AD) with an option for Full Scale Development was awarded to Westinghouse Electric Corporation in December 1991. The ICR is derived from the Rolls-Royce RB211 aircraft engine and through the introduction of an intercooler, recuperator, and variable area nozzles achieves approximately a 25% to 27% propulsion annual fuel savings when compared to the LM2500 on a mechanical drive ship. (U) ICR full scale system development testing began in July 1994 and completed at Pyestock, U. K. on 30 April 1999. Recuperator recovery efforts are continuing following the failure in January 1995 of the initial recuperator. An Engineering Development Model (EDM) recuperator, which is the exhaust heat recovery unit that provides most of the fuel efficiency gains, was delivered to the test site in January 1995. Testing on this EDM has met expectations. System testing to date has completed over 1400 hours of successful testing including over 1150 hours with the second generation recuperator and 175 hours with the EDM recuperator. Tests to date have met objectives. (U) A Cooperative Agreement between the United Kingdom (U.K.) and United States governments was signed by USD(A&T) on 21 June 1994 and revised in March 1997 for in-kind and cash contributions to the ICR program. A Cooperative Agreement between the French and United States governments was signed by ASN(RD&A) on 30 August 1995 for in-kind and cash contributions to the

(U) The FY 1999 funds for Integrated Power Systems (IPS) were budgeted and executed under P. E. 0603573N/Project S1314. IPS funding has transitioned to P. E. 0603513N/Project 32471 for both budget and execution in FY 2000 and out.

R-1 SHOPPING LIST - Item No.

52-3 of 52-7

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 4 of 35)

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	EXHIBIT R-2a, RDT&E	E Project Justification	ation		DATE	February 2000	000
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/BA-4	PROGRAM ELEMENT NAME AND NUMBER ADVANCED SURFACE MACHINERY/PE 0603573N	ME AND NUMBER ACHINERY/PE 06035	573N	PROJECT NAM	PROJECT NAME AND NUMBER ICR-GAS TURBINE ENGINE/S1314	4	
(U) PROGRAM ACCOMPLISHMENTS AND PLANS:	ID PLANS:						
1. (U) FY 1999 ACCOMPLISHMENTS: (U) (\$29.478) ICR: Completed the manufacture and delivered the EDM recuperator. Installed the recuperator at the Royal Navy test facility in Pyestock and performed the last development test at NAVSSES, Philadelphia. This test has been renamed "The Navy Five Hundred Hour Test" (NFHT). The test site was configured for ICR test Pyestock. Initiated the last development test at NAVSSES, Philadelphia. This test has been renamed "The Navy Five Hundred Hour Test" (NFHT). The test site was configured for ICR test engine, recuperator, enclosure and all ancillary hardware were delivered to the site, assembled and installed. Modification of the Memoranda of Understanding with the U.K. and France was prepared. This modification implements the "Essential Program".	nufacture and delivered the ED est at NAVSSES, Philadelphi lary hardware were delivered to all Program".	OM recuperator. Instalia. This test has bee o the site, assembled	lled the recuperator on renamed "The Ni and installed. Modi	at the Royal Navy te avy Five Hundred H fication of the Memo	st facility in Pyestoc our Test" (NFHT). randa of Understan	recuperator. Installed the recuperator at the Royal Navy test facility in Pyestock and performed the last development test at This test has been renamed "The Navy Five Hundred Hour Test" (NFHT). The test site was configured for ICR testing. It is site, assembled and installed. Modification of the Memoranda of Understanding with the U.K. and France was prepared.	relopment test at de for ICR testing. The was prepared.
2. (U) FY 2000 PLAN: (U) (\$23.981) ICR: The development test at NAVSSES, Philadelphia will complete. A final development Design Review called DR5 will be conducted. Following this design review, the development portion of the "Essential Program" will be complete. At that time, the joint U.S./U.K. and U.S./France programs will be transitioned to U.K./France for management of the qualification program.	st at NAVSSES, Philadelphia ram" will be complete. At that	will complete. A fine: time, the joint U.S./U	il development Desi .K. and U.S./France	ign Review called DF programs will be tra	र5 will be conducted nsitioned to U.K./Fr	l complete. A final development Design Review called DR5 will be conducted. Following this design review, the e, the joint U.S./U.K. and U.S./France programs will be transitioned to U.K./France for management of the qualific	w, the qualification program.
(U) (\$0.611) ICR: Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.	rogram is reserved for Small E	3usiness Innovation R	esearch assessmer	nt in accordance with	15 USC 638.		
3. (U) FY 2001 PLAN: (U) (\$5.635) ICR: The Royal and French navies will be performing the 3' in the Steering Committee, technical review, monitoring tests and accepting	ch navies will be performing th w, monitoring tests and accep	ne 3150 hour enduran king test results for co	150 hour endurance qualification test, which will require test results for compliance to U.S. Navy requirements.	, which will require ei	ighteen months. U.	150 hour endurance qualification test, which will require eighteen months. U.S. Navy responsibilities will include participation test results for compliance to U.S. Navy requirements.	nclude participation
B. (U) OTHER PROGRAM FUNDING SUMMARY:	JMMARY: N/A						
FY1999 FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	TO COMPLETE	TOTAL COST
C. (U) ACQUISTION STRATEGY: ICR is a candidate system for DD-21.	s a candidate system for DD-2	21.					

R-1 SHOPPING LIST - Item No. 52-4 of 52-7

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 2 of 6)

UNCLASSIFIED

EXHIBIT I	EXHIBIT R-2a, RDT&E Project Justification	DATE	
	•	•	February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E,N/BA-4	ADVANCED SURFACE MACHINERY/0603573N	ICR-Gas Turbine Engine/S1314	

D. Schedule Profile:

ICR ESSENTIAL PROGRAM

		FY99	66			H.	FY00	
ICR	OND	JFM	OND JFM AMJ JASONDJFM AMJ JAS	JAS	OND	JFM	AMJ	JAS
Design Reviews						DRS		
Recuperator Hardware Delivery	EDM#1	Λ#1 Δ						
Testing Pyestock NAVSSES		A	A5		NELT			

R-1 SHOPPING LIST - Item No. 52-5 of 52-7.

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 4 of 6)

UNCLASSIFIED

								DATE				
Exhibit R-3 Cost Analysis (page 1)	e 1)							i 		February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	<u></u>	PROGRAM ELEM	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	(BER				
RDT&E, N/BA4		0603573N				ADVANCED !	SURFACE MA	ADVANCED SURFACE MACHINERY/S1314	14			
Cost Categories	Contract	Performing	Total		FY 99		FY 00	į	FY 01	:	;	
(Tailor to WBS, or System/Item	Method	Activity &	P√ S ±	FY 99	Award	FY 98	Award	FY 01	Award	Cost to	Cost	l arget Value of Contract
Demon Lordway Development	C/CDAF	_	296 759	25,663	024 98	342	66 to C	3.885	00 100	4.658	343.307	
Ancillary Hardware Development	5					1						
Systems Engineering	C/CPAF	Other Contractor	0.208	0:020	Oct 98	0.200	Oct 99	0.050	Oct 00	0.250	0.758	
Licenses												
Tooling												
Cost Improvement						7.000					7.000	
Award Fees	CCIAF	NG, Sunnyvale, CA	6.375	0000	66/80	1.224	04/00	0.000		0.000	7.599	
Subtotal Product Development			303.342	25.713		20.766		3.935		4.908	358.664	
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE	-											
Subtotal Support												
Remarks:												
			R-1 SHO	R-1 SHOPPING LIST - Item No. 52-6 of 52-7	- Item No. 5	12-6 of 52-7						

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 5 of 6)

UNCLASSIFIED

PROGRAM ELEMENT D603573N	DATE: February 2000	PROJECT NAME AND NUMBER	ADVANCED SURFACE MACHINERY/S1314		Award FY 00 Award FY 01 Award Cost to Total	Date Cost Date Complete Cost	65 Oct 98 3.826 Oct 99 1.700 Oct 00 15.990 32.466		3.765 3.826 1.700 15.990 32.466	0000										478 24,592 5.635 20,898 391,130			
		PROGRAM ELEMENT	0603573N	г	PY s FY 99	Cost	7.185			_										310.527 29.478	ŀ		

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 6 of 6)

UNCLASSIFIED

EXHIBIT R-2, F	2. RDT&E Budget Item Justification	Justification				DATE:			
							Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NO	R-1 ITEM NOMENCLATURE				
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA 4	N, NAVY/BA 4			Combat Sys	tems Integra	Combat Systems Integration 0603582N	32N		
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Total PE Cost	37.492	78.305	32.966	38.054	47.448	48.895	50.726	Cont.	Cont.
Combat Systems Integration S0164	37.492	78.305	32.966	38.054	47.448	48.895	50.726	Cont.	Cont.
Quantity of RDT&E Articles	N/A	A/N	N/A	N/A	N/A	N/A	A/A	N/A	A/A

A. Mission Description and Budget Item Justification: This project provides shore based testing of integrated combat direction, weapon, sensor and computing systems prior to their installation in operationalfleet units. The operational computer programs are assembled and tested to assure proper configurationand interoperability in a test environment similar to their ultimate shipboard operational environment. Included is operational assessment testing of the integrated suite of computer programs. Additionally, with issuance of CNO MSG DTG 021648Z May 1998, on Battle Group Interoperability (BGI), this program includes Battle Group (BG)/Battle Force (BF) requirements engineering, analysis, BG/BF configuration management and BG Interoperability testing which is a prerequisite for operational Certification of the battle group configuration. This is the only opportunity for comprehensive interoperability testing of combat system and C4I configuration items prior to shipboard delivery for operational use in surface combatant platforms and battle group units. The BG/BF requirements engineering effort is designed to support the development systems interoperability through a Common Command and Decision capability. Configuration control is maintained by updates to the Surface Combat System Master Plan (SSCSMP).

PROGRAM ACCOMPLISHMENT AND PLANS:

1. (U) FY 1999 ACCOMPLISHMENTS:

(U) (\$6.972) Conducted Combat Systems Integration Testing (CSIT) of Advanced Combat Direction System (ACDS) of Block-0 and 1, Cooperative Engagement Capability (CEC) Baseline 1 and Ships Self Defense System (SSDS) MK-1, and Combat Direction System Level 13 in CV/CVN, LHD, LHA-2, FFG and LSD Ship Classes. Continued design and development of surface ship test beds to include networks for the LHD-7, CVN 68, CVN 76, LHA-1 and LPD 17 ships/classes. Continued planning for out-year Combat System Integration Testing (CSIT) including Common Scenario/Common Environment Simulation (CSCE), test bed and test procedures design and development.

R-1 SHOPPING LIST - Item No. 54

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 5)

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification	DATE:
	February 2000
APPROPRIATION/BUDGET ACTIVITY R	R-1 ITEM NOMENCLATURE
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA 4	Combat Systems Integration 0603582N

(U) (\$15.674) Conducted Battle Group Interoperability Testing (BGIT) in USS THEODORE ROOSEVELT, USS CONSTELLATION AND USS JOHN F. KENNEDY Carrier Battle Groups (CVBGs). Developed the test plans and procedures to support Certification of surface ship combat systems, C4ISR systems and Battle Group Interoperability (BGI). Prepared test beds to support Battle Group Interoperability (BGIO) testing for USS ABRAHAM LINCOLN, USS GEORGE WASHINGTON, USS ENTERPRISE, USS CARL VINSON, USS CONSTELLATION and USS HARRY S. TRUMAN Carrier Battle Groups (CVBGs) (U) (\$5.773) Continued execution of D-30 Process including; Battle Group Action Officer (BGAO) efforts, BG Change Control Process, Land Based Triage, BG Capabilities and Limitations Report and Engineering assessments.

(U) (\$8.773) Initiated the development of Warfare Systems Engineering Requirements. Conducted BG related sytems engineering efforts, to include Design Reference Mission (DRM) and Analysis of Alternatives studies (AOA). Initiated Warfare Systems Engineering studies for Common Command and Decision (C&D).

(U) (\$.3) Continued SSCSMP updates.

(U) FY 2000 PLAN:

(U) (\$9.1) Conduct Combat System Integration Testing (CSIT) of Advanced Combat Direction System (ACDS) of Block-1, level 2.1X, ACDS Block-0, level 10.24, Cooperative Engagement Capability (CEC) Baseline-1, and Combat Direction System (CDS) level 12/13 in CV/CVN, LHD, LHA-1, LHA-2, and FFG ship classes. Continue design and development of surface ship test beds to include networks for the CVN-68, CVN-76 and LPD-17 ships/classes. Continue planning for out-year Combat System Integration Testing (CSIT) including Common Scenario/CommonEnvironment (CSCE) Simulation, test bed and test procedures design and development. (U) (\$25.10) Conduct Battle Group Interoperability Testing (BGIT) in USS ABRAHAM LINCOLN, USS GEORGE WASHINGTON, USS ENTERPRISE, USS CARL VINSON, USS CONSTELLATION and USS HARRY S. TRUMAN carrier Battle Groups (CVBGs). Develop the test plans and test procedures to support Certification of surface ship class combat systems, C4ISR systems and Battle Group Interoperability (BGI). Prepare test beds to support Battle Group Interoperability (BGIO) testing for up to six Carrier Battle Groups (CVBGs). Conclude DEP Phases 1/2. (U) (\$39.0) Continue Warfare Systems Engineering Requirements development. Conduct BG related systems engineering efforts, to include Design Reference Mission (DRM) and Analysis of Alternatives studies (ADA). Continue Warfare Systems Engineering studies for Common Command and Decision (C&D).

R-1 SHOPPING LIST - Item No. 54

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 2 of 5)

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification	DATE:
	February 2000
APPROPRIATION/BUDGET ACTIVITY R-1 ITEM NOMENCLATURE	
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA 4	gration 0603582N
(U) (\$4.8) Continue execution of D-30 Process including: BGAO efforts, BG Change Control Process, Land Based Triage, BG Capabilities and Limitations Report and Engineering assessments.	and Limitations Report and Engineering assessments.
(U) (\$.3) Continue SSCSMP updates.	
Note: \$1.065M of the FY00 funding represents that portion of the extramural program that is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.	rch assessment in accordance with 15 USC 638.

(U) (\$8.958) Conduct Combat System Integration Testing (CSIT) of Advanced Combat direction System (ACDS) Block-0, level 10.25, Block-1 upgrades; Command and Control Processor (C2P) upgrade; Cooperative Engagement Capability (CEC) Baseline-2; Ship Self Defense System (SSDS)MK-2, mod-0 in CV/CVN, LHD, and LHA ship classes. Continue design and development surface ship test beds to include networks for the CVN-76 and CV/LHD SSDS MK-2, mod-1 back-fit classes. Continue planning for out-year Combat System Integration Testing (CSIT) including Common Scenario/Common Environment (CSCE) Simulation, test bed and test procedures design and development.

3. (U) FY 2001 PLAN:

- (U) (\$6.458) Conduct Battle Group Interoperability(BGIO) testing in up to six carrier battle Groups (CVBGs). Prepare test beds to support Battle Group Interoperability(BGIO) testing for six Carrier Battle Groups (CVBGs).
- (U) (\$13.590) Continue Warfare Systems Engineering Requirements development. Conduct BG related systems engineering efforts, to include Design Reference Mission (DRM) and Analysis of Alternatives studies (AOA). Continue Warfare Systems Engineering studies for Command and Decision (C&D).
- (IU) (\$3.66) Continue execution of D-30 Process including: BGAO efforts, BG Change Control Process, Land Based Triage, BG Capabilities and Limitations Report and Engineering assessments.
- (U) (\$.3) Continue SSCSMP updates.

R-1 SHOPPING LIST - Item No. 54

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 3 of 5)

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification	DATE:	February 2000
A AGIVINA MOL	R-1 ITEM NOMENCLATURE	
	III IIII AND I AND	
FY 1999 FY 2000 President's Budget: 9.654 Appropriated Value: 9.654	FY 2000 46.740 78.740	FY 2001 24.239
Adjustment to FY 1999/2000 Appropriated Value/ FY 2000 President's Budget: FY 2001 PRES Budget Submit:	-0.435 78.305	8.727 32.966
Funding: FY 1999: Increase by Above Threshold Reprogramming (+\$30,000); congressional undistributed reductions of -\$1.899K and -\$263K for minor pricing adjustments. FY 2000: Decrease for minor pricing adjustments of -\$435K. FY 2001: Increase by programming for Common C&D (+\$9,000) and minor pricing adjustments of -\$273K.		
Schedule: Not applicable.		
C. Other Program Funding Summary: Not applicable.		
Related RDT&E: Computer programs developed under these programs are tested in their integrated configuration.		
PE 0204571N (Consolidated Training Systems Development) PE 0206520N (Surface ASW Combat System Technology) PE 0603382N (Advanced Combat System Technology) PE 0603755N (Ship Self Defense) PE 0603852N (Cooperative Engagement Capability) PE 0604307N (AEGIS Combat Systems Engineering) PE 0604755N (Ship Self Defense)		
Acquisition Strategy: Not applicable. D. Schadula Profile: Not amplicable.		
D. Odriedano i John S. Maria approach		

R-1 SHOPPING LIST - Item No. 54

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 4 of 5)

UNCLASSIFIED

Exhibit R-3 Cost Analysis (page 2)	ge 2)							DATE:		February 2000	9	
APPROPRIATION/BUDGET ACTIVITY	VITY	PROGRAM ELEM	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E, N		0603582N				Combat Sys	Combat Systems Integration	ıtion				
Cost Categories	Contract	Performing					FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Activity &	PY s	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Combat Sys Integ Testing/SOI	WR/RC	NSWC PHD	700	8	AR	8	VAR	6.300	VAR	Cont.	Cont	100 10
Combat Sys Integ Testing/SQI	WR/RC	NSWC DD	1.600									
Combat Sys Integ Testing/SQI	WR/RC/PD VARIOUS	VARIOUS	1.500	0.500		0.600		0.460		Cont.	Cont	
BG Capabilities/Limitations	WR/RC	NSWC PHD	1.000	3.500	VAR	4.200	VAR	3.000	VAR	Cont.	Cont	
BG Capabilities/Limitations	WR/RC	NSWC DD										
BG Capabilities/Limitations	WR/RC/PD VARIOUS	VARIOUS		0.100		0.150		0.160	VAR	Cont.	Cont	
DEP/BGIT Cert/Triage	WR/RC	NSWC PHD										
DEP/BGIT Cert/Triage		NSWC DD		13.202		16.890		5.170		Cont.	Cont	
DEP/BGIT Cert/Triage	WR/RC/PD VARIOUS	VARIOUS		1.220		2.965		1:057	VAR	Cont.	Cont	
Warfare Sys Eng/C&D	WR/RC	NSWC PHD										
Warfare Sys Eng/C&D	WR/RC	NSWC DD		1.700		2.000		1.400		Cont.	Cont	
Warfare Sys Eng/C&D		VARIOUS		2.900		33.400		2.557		Cont.	Cont	
Contract Engineering Support	VARIOUS	VARIOUS	1.300	6.790	VAR	9.100	VAR	12.762	VAR	Cont.	Cont	
Travel		NAVSEA Travel	0.040	0.080		0.100		0.100		Cont.	Cont	
Subtotal Test & Evaluation			11.140	37.492		78.305		32.966		Cont.	Cont	
Remarks:												
	-		-			!						:
Total Cost			11.140	37.492		78.305		32.966		Cont.	Cont	
Remarks:												
			TOHOT	D.1 SHODDING LIST . Ham No 54	Ham No 5	_						

R-1 SHOPPING LIST - Item No. 54

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 5 of 5)

UNCLASSIFIED

EXHIBIT R-2, R	EXHIBIT R-2, RDT&E Budget Item Justification	Justification				DATE:	Fehr	Eahrijary 2000	
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION. NAVY/BA4	N. NAVY/BA4			R-1 ITEM NOI	R-1 ITEM NOMENCLATURE Conventional Munitions/0603609N	N609	3	ood (ma	
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	37.098	39.087	28.619	26.900	24.528	26.368	25.194	CONT.	CONT.
Conventional Fuze/Warhead Package/K1821/U1821	23.991	24.635	24.528	18.552	18.766	19.000	19.524	CONT.	CONT.
Optical Correlators/ K2393/U2393*	0.000	3.978	0.000	0.000	0.000	0.000	0.000	CONT.	CONT.
Non-Nuclear Expendable Ordnance (NNEO)/K2299	2.250	1.353	0.867	0.950	0.958	0.976	1.002	CONT.	CONT.
Insensitive Munitions Advanced Development/S0363	9.889	9.121	3.224	7.398	4.804	6.392	4.668	CONT.	CONT.
Env Safe Energetic Materials/S2611	0.968	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.968
Quantity of RDT&E Articles									

Funded in FY99 under 604366N/K2640/U2640)

A. Mission Description and Budget Item Justification

Current specific requirements and initiatives to address them include: development of advanced missile fuzing system to replace MK 45 MOD 9 and MK 11 Target Detecting Conventional Fuze/Warhead Package (Project K1821/U1821): The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. Devices (TDDs) for future production missiles (SM-2 Blocks IIIB and IVA); development of modeling and simulations for new reactive warhead; development of advanced

components for future advanced ordnance system; and performance of a trade-off analysis for the selection of a future advanced ordnance package. This project will, in future years, also provide a vehicle to address emergent requirements by transitioning mature fuze and warhead technology from conceptual developments to engineering development with minimum technical and financial risk.

Non-Nuclear Expendable Ordnance (NNEO) (Project K2299): This item addresses improvements to Navy surface launched (2T) non-nuclear expendable ordnance. supports transition of the Multi-Function Fuze from Engineering and Manufacturing Development (E&MD) to production.

bullet impact, thus presenting a great hazard to ships, aircraft, and personnel. This IMAD program will provide, validate, and transition technology for explosives, propellants, Insensitive Munitions Advanced Development (IMAD) (Project S0363): Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and and ordnance to enable production of munitions insensitive to unplanned stimuli with no reduction to combat performance.

Environmentally Safe Energetic Materials (Project S2611): This project will mature and demonstrate energetic materials and processes for explosives, propellants, and environmentally safe materials will meet insensitive munitions and system performance requirements while lowering the total ownership costs of the weapon systems. pyrotechnics which minimize or eliminate any adverse environmental impact normally associated with these materials in production and demilitarization. These new

R-1 SHOPPING LIST - Item No. 55 - 1 of 55 - 19

(Exhibit R-2, page 1 of 19) Exhibit R-2, RDT&E Budget Item Justification

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification	DATE:
	February 2000
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA4	Conventional Munitions/0603609N

Optical Correlator Technology (Project K2393): The purpose of this effort is to enhance next generation target discrimination and aimpoint selection performance.

Note: In accordance with 15 USC 638, \$.458M in FY 2000 is reserved for the Small Business Innovation Research (SBIR) assessment.

FY 2000 FY 2001	34.309 31.318	39.309		-0.222	``
FY 1999	40.596	40.775		-3.677	37.098
B. (U) Program Change Summary	FY 2000 President's Budget:	Appropriated Value:	Adjustment to FY 1999/2000 Appropriated Value/	FY 2000 President's Budget:	FY 2001 President's Budget Submit:

requirements and approved program reductions (\$-1.000), inflation savings (-\$0.185), actuals update (-\$0.349) below threshold reprogramming (-\$0.007), midyear review decision (\$-.482), and for various rate adjustments (-\$0.179); and an increase in Conventional Fuze/Warfare Package to fund approved FY99 change is due to SBIR transfer (-\$0.775), decreases for Insensitive Munitions for March 1999 update (-\$1.200), to fund approved emergent emergent requirements (\$+0.500).

priority O&M,N deficiencies (-\$0.140), NWCF rate adjustments (+\$0.193), pricing adjustments (-\$0.469), Strategic Sourcing Program Redistribution (-\$0.183), FY00 reduction is due to minor adjustments (-\$0.005) and undistributed congressional reductions (-\$0.217).
FY01 change is due to adjustments for Conventional Fuze (+\$4.300) and Insensitive Munitions (-\$1.900), a decrease for offsets required to finance high an offset in Insensitive Munitions for higher priority programs (-\$4.500).

Schedule: Not applicable.

Technical: Not applicable.

R-1 SHOPPING LIST - Item No. 55 -2 of 55 - 19

(Exhibit R-2, page 2 of 19) Exhibit R-2, RDT&E Budget Item Justification

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	tification				DATE:			
		,						Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM EL	ELEMENT NAME AND NUMBER	AND NUMBE	5.	PROJECT NAME AND NUMBER	ME AND NUM	BER			
RDT&E, N BA4	Convention	Conventional Munitions/0603609N	s/0603609N		Conventional F	uze and Warh	Conventional Fuze and Warhead Package /K1821/U1821	K1821/U1821		
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003		FY 2005	FY 2004 FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		23.991	24.635	24.528	18.552	18.766	19.000	19.524	Continuing Continuing	Continuing
RDT&E Articles Qtv										

A. Mission Description and Budget Item Justification

and 6.3A investments into E&MD missile/weapon systems. This program addresses increased lethality against current and emerging threats, is responsive to all mission improvements in warhead and fuze technology to meet this requirement. This program is a significant vehicle for orderly planning, timely and effective transition of Navy 6.2 areas - anti-air, strike, defense suppression, theater defense and ship defense, and supports development of complete ordnance sections. The current, on-going projects address significant technology advancements for missile systems by developing: mature physical concepts to enhance anti-air kill probability, advanced ordnance with augmented overland cruise missile defense and theater ballistic missile defense capabilities, and advanced seeker technology. The program supports the full spectrum of The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. This is the only Navy 6.3B RDT&E program that addresses missile advanced development and technology improvements, and in future years will continue to provide the vehicle to address emergent requirements by transitioning mature development efforts into weapon systems with minimal technical and financial risk.

(U) PROGAM ACCOMPLISHMENTS AND PLANS:

- 1. (U) FY 1999 ACCOMPLISHMENTS:
- (U) (\$.293) DIRECTIONAL ORDNANCE SYSTEM: Prepared final report and project closed-out. (U) (\$.205) ADVANCED STRIKE WARFARE HIGH VELOCITY PENETRATOR: Conducted low-level testing and data collection.
- (U) (\$1.209) ORDNANCE COMPONENT TECHNOLOGY: Completed efforts on high energy density capacitors. Initiated efforts on near field contact sensors and enhanced low energy exploding foil initiator.
 - (U) (\$1.344) ADVANCED ORDNANCE SECTION: Started interim down select to 3-4 warhead concepts variants. Incorporated updated fuze models, conducted critical experiments, performed fabrication/evaluation studies, performed end-game statistical assessments. Incorporated reactive fragments vulnerability models.
 - (\$.484) FUZE CONTACT DEVICE: Completed baseline design.
- (U) (\$1.430) MICRO-ELECTRICAL MACHINE SYSTEM (MEMS) ŠAFE & ARMING (S&A) DEVICE: Generated requirements and conducted critical tests. (U) (\$1.275) REACTIVE MATERIAL WARHEAD: Conducted preliminary studies and risk reduction efforts.

R-1 SHOPPING LIST - Item No. 55 - 3 of 55 - 19

(Exhibit R-2a, page 3 of 19) Exhibit R-2a, RDT&E Project Justification

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EXHIB	EXHIBIT R-2a, RDT&E Project Justification	DATE:	
		Feb	February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N BA 4	Conventional Munitions/0603609N	Conventional Fuze and Warhead Packaging /K1821/U1821	821

- 1. (U) FY 1999 ACCOMPLISHMENTS: (Continued)
- (U) (\$3.617) LOW COST STANDARD FUZE. Developed requirements and started preliminary design of MK 45 MOD 9/11 replacement.
 - (U) (\$.052) UNCOOLED FOCAL PLANE ARRAY STUDY: Supported ONR study
 - (U) (\$13.582) OFFICE OF SPECIAL PROJECTS
- (U) (\$.500) To fund approved emergent requirements for Conventional Fuze/Warhead Package.
- 2. (U) FY 2000 PLAN:
- (U) (\$1.101) ORDNANCE COMPONENT TECHNOLOGY: Initiate efforts on delayed functioning exploding foil initiator (EFI) and conduct tests of warhead fragmentation control candidates.
 - (U) (\$1.269) ADVANCED ORDNANCE SECTION: Conduct endgame analyses, test prototype warthead candidates.
 - (U) (\$1.330) MEMS S&A: Hardware evaluations, design arming control unit, reliability analysis.
 - (U) (\$.500) FUZE CONTACT DEVICE: Fabricate and evaluate baseline design.
- (U) (\$2.000) LOW COST STANDARD FUZE: Begin critical design and development of hardware and software.
 - (U) (\$18.435) OFFICE OF SPECIAL PROJECTS
- 3. (U) FY 2001 PLAN:
- (U) (\$1.690) ORDNANCE COMPONENT TECHNOLOGY: Continue evaluation of advanced warhead materials and fragmentation control techniques, continue EFI development.
 - (U) (\$3,000) ADVANCED ORDNANCE SECTION: Complete critical experiments.
- MEMS S&A: Conduct critical tests. - (U) (\$2.500)
- FUZE CONTACT DEVICE: Develop hardening requirements, initiate design optimization. -(U) (\$.500)
 - (U) (\$6.801) LOW COST STANDARD FUZE: Continue MK 45 MOD 12 TDD development
- (U) (\$1.062) KILL MECHANISMS: Initiate development methodology to evaluate alternate kill mechanisms.
 - OFFICE OF SPECIAL PROJECTS
- B. Other Program Funding Summary: Not applicable.C. Acquisition Strategy: Not applicable.D. Program Schedule: Not Applicable.
- Program Schedule: Not Applicable.

R-1 SHOPPING LIST - Item No. 55 - 4 of 55 - 19

(Exhibit R-2a, page 4 of 19) Exhibit R-2a, RDT&E Project Justification

CLASSIFICATION:

UNCLASSIFIED

								DATE:			9	
Exhibit R-3 Cost Analysis (page 1)	∍ 1)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	۲	PROGRAM ELEMENT	_EMENT			PROJECT NA	PROJECT NAME AND NUMBER	1BER				
RDT&E, N BA 4		Conventional Munitions/0603609N	nal Munition	18/0603609N	_	Conventional	Fuze and War	Conventional Fuze and Warhead Package/K1821/U1821	K1821/U1821			
	Contract	Performing	Total		FY 99		FY 00		FY 01			
or System/Item	Method			FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
				Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
alvsis		Q	3.123	1.825	11/98	0.528	11/99	1.980	11/00	Continuing	Continuing	
	WR	NAWC/China Lake	55.042	2.522	11/98	1.152	11/99	4.430	11/00	Continuing	Continuing	
	PAF	SS/CPAF Motorola/Raytheon	4.474	1.600	12/98	0.000		0.000		0.000	6.074	6.074
	RC	ONR	0.000	0.052	01/99	0000		000.0		Continuing	Continuing	
		Office of Special Projects	7.751	0.000		000.0		0.000		0000	7.751	N/A
Hardware Fabrication & Procuremen WR	WR	NSWC/DD	5.000	0.700	11/98	0.312	11/99	0.947	11/00	Continuing	Continuing	
	WR	NAWC/China Lake	6.500	0.800	11/98	0.988	11/99	2.215	11/00	Continuing	Continuing	
	SS/CPAF	SS/CPAF Motorola/Ravtheon	0.300	0.200	12/98	0.000		0.761	11/00	0.000	1.261	1.261
Other	PD	Office of Special Projects	1.100	14.082	12/98	18.435	12/99	8.975	12/00	Continuing	Continuing	
total Product Development			108.290	21.781		21.415		19.308		Continuing	Continuing	
Remarks:												
Development Support Equipment		,										
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												1
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

R-1 SHOPPING LIST - Item No. 55 - 5 of 55 - 19

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 5 of 19)

UNCLASSIFIED

								DATE				
Exhibit R-3 Cost Analysis (page 2)	Je 2)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	/ITY	PROG	PROGRAM ELEMENT			PROJECT N	PROJECT NAME AND NUMBER	1BER				
RDT&E, N BA 4		Conv	Conventional Munition	N609E090/suo	z	Conventional	Conventional Fuze and Warhead Package/K1821/U1821	head Package/	K1821/U1821			
Cost Categories (Tailor to WBS, or System/Item	Contract Method	Performing Activity &	Total PY s	FY 99	FY 99 Award	FY 00	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to	Total Cost	Target Value of Contract
Requirements)	WR WR	NSWC/DD	10.447	1.000	11/98	1.000	66/1	2.000	11/00	Continuing	Continuing	
בפווסוומת שניסון ובפי מ באמותמוסו	WR	NAWC/China Lake	10.482	1.000	11/98	2.000	11/99	3.000	11/00	Continuing	Continuing	
Subtotal T&E			20.929	2.000		3.000		5.000		Continuing	Continuing	
Remarks:												****
Program Management Support	WR	NSWC/DD	1.899	0.050	11/98	0.075	11/99	0.075	11/00	Continuing	Continuing	
	WR	NAWC/China Lake	3.135	0.100	11/98	0.075	11/99	0.075	11/00	Continuing	Continuing	
	C/FPI	TMAI	0.000	0.010	11/98	0.020	11/99	0.020	11/00	Continuing	Continuing	
Travel	ᇟ	NAVSEA Travel	0.200	0.050	Various	0.050	Various	0.050	Various	Continuing	Continuing	
Subtotal Management			5.234	0.210		0.220		0.220		Continuing	Continuing	
Remarks:						:						
Total Cost			134.453	23.991		24.635		24.528		Continuing	Continuing	
Remarks:												
			R-1 SHO	LSI I SNIddi	- Item No. 5	R-1 SHOPPING I IST - Item No. 55 - 6 of 55 - 19	19					

R-1 SHOPPING LIST - Item No. 55 - 6 of 55 - 19

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 6 of 19)

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Jus	tification				DATE:			
		•						Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM EL	EMENT NAME	PROGRAM ELEMENT NAME AND NUMBER	~	PROJECT NA	PROJECT NAME AND NUMBER	BER			
RDT&E, N BA 4	Conventional M	al Munition	Innitions/0603609N		Non-Nuclear E	xpendable Orc	Non-Nuclear Expendable Ordnance (NNEO)/K2299	/K2299		
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		2.250	1.353	0.867	0.950	0.958	0.976	1.002	Continuing	Continuing
RDT&E Articles Qty										

comprising 2T NNEO are: Major and medium caliber gun ammunition, small arms ammunition, other ship gun ammunition, pyrotechnics, and demolition items. There are no other RDT&E budget items supporting the 2T NNEO program. This project supports the Multi-function Fuze (MFF), Mk 2 Grenade Proximity Fuze and Cargo Competent Fuzes. These A. Mission Description and Budget Item Justification:
 The commodities
 This budget item addresses improvements to Navy surface launched (2T) non-nuclear expendable ordnance (NNEO) outside existing operational requirements. The commodities fuzes will be used with 5"/54 gun ammunition.

(U) PROGAM ACCOMPLISHMENTS AND PLANS:

- 1. (U) FY 1999 ACCOMPLISHMENTS:
- (U) (\$2.250) Multi-Function Fuze (MFF): Incorporated changes to the design of the fuze which reduces cost, increases producibility and improves performance. Pre-Planned Product Improvement (P3I) items include: new battery and semiconductor bridgewire. Achieve Milestone III.
- 2. (U) FY 2000 PLANS:
- (U) (\$1.353) Multi-Function Fuze (MFF): Incorporate pre-planned product improvement programs to reduce fuze unit cost, increase producibility and performance. P3l items include: multi-plexing air mode and initial velocity sensor.
- 3. (U) FY 2001 PLANS:
- (U) (\$.867) Multi-Function Fuze (MFF): P3l items include: evaluation of Micro-Electro-Mechanical System (MEMS) Technology and begin Preliminary Design.

R-1 SHOPPING LIST - Item No. 55 - 7 of 55 - 19

(Exhibit R-2a, page 7 of 19) Exhibit R-2a, RDT&E Project Justification

UNCLASSIFIED

		XHIBIT R-2a, F	EXHIBIT R-2a, RDT&E Project Justification	stification			DATE: February 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E, N BA 4	T ACTIVITY	PROG	PROGRAM ELEMENT NAME AND NUMBER Conventional Munitions/0603609N	IE AND NUMBER 1S/0603609N	ΞŽ	ROJECT NAME on-Nuclear Expe	PROJECT NAME AND NUMBER Non-Nuclear Expendable Ordnance (NNEO)/K2299
B. Other Program Funding Summary	nding Summary						
1. (U) Related RDT&E: PE 0603795 (Naval Surface Fire Support)	E: PE 0603795 (Nε	wal Surface Fin	e Support)				
2. (U) The 5"/54 Improved Conventional Munition projectile will be FY99. Milestone III scheduled for 1st quarter FY01.	roved Conventiona heduled for 1st qua	l Munition proje arter FY01.		ied with the MI	FF. Approv	al decision fc	qualified with the MFF. Approval decision for proceeding with Low Rate Initial Production in 3rd quarter
Procurement of Ammunition, Navy and Marine Corps (PANMC) 5"/54	nition, Navy and Ma	arine Corps (P/		unition, BLIN 02	25000, Cost	Code AC100	Ammunition, BLIN 025000, Cost Code AC100 and AC893 (Reno)
FY 1999	FY 2000	FY 2001 FY	FY 2002 FY 2003	3 FY 2004	FY 2005	To Complete	Total Cost
0.0	11.0	8.0	7.2 6.7	6.8	6.8	TBD	TBD
C. Acquisition Strategy: Award 5-Year (Multi-Year) contract for MFF.	gy: Award 5-Year (Multi-Year) cor		P3I are comple	eted, they wi	II be incorpora	As P3I are completed, they will be incorporated into the next production lot.
D. Schedule Profile							
	FY 1999		FY 2000		Щ.	FY 2001	
Program Milestones					← ←	10 MSIII 10 IOC	
Engineering Milestones							
T&E Milestones	1Q TECHEVAL OPEVAL	IEVAL	1Q TECHEVAL P31 1Q OPEVAL P31	:VAL P31 \L P31			
Contract Milestones	3Q PRODUCTION 3QPRODUCTION	3Q PRODUCTION 3QPRODUCTION P3I	1Q PRODL	RODUCTION P31	က	3Q PRODUCTION P3I	TION P3I

R-1 SHOPPING LIST - Item No. 55 - 8 of 55 - 19

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 8 of 19)

CLASSIFICATION:

									DATE:				
Exhibit R-3 Cost Analysis (page 1)	ge 1)										February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	/ITY	PR	PROGRAM ELEMENT	MENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E, N BA 4		<u>8</u>	nventional	Munition	Conventional Munitions/0603609N	7	Non-Nuctear E	Non-Nuclear Expendable Ordnance (NNEO)/K2299	dnance (NNEC)/K2299			
Cost Categories	Contract	Contract Performing	7	Total						FY 01			
(Tailor to WBS, or System/Item	Method	Activity &	<u>a</u>	ργs	FY 99	Award	FY 80		FY 01	Award	Cost to	Total	Target Value
(Requirements)	& Type	& Type Location	<u>ठ</u>		Cost	Date		Date		Date	Complete	Cost	of Contract
Primary Hardware Development	WR	NSWC Dahlgren		0.195	0.718	VAR	0.234	VAR	299'0	VAR	CONT.	CONT	A/A
	C/CPFF	C/CPFF ALLIANT		0.322	0.536	VAR	0.094	VAR	0.200	VAR	CONT.	CONT	A/N
	SS/CPFF	SS/CPFF MOTOROLA		0.300	0.200	VAR	0.150	VAR	0.000		0.000	0.650	N/A
Subtotal Product Development				0.817	1.454		0.478		0.867		0.000	CONT	Ϋ́Ν
Remarks:													

0.00 0.000 0.000 0.000 0.000 0.000 Development Support Equipment
Software Development
Training Development
Integrated Logistics Support
Configuration Management
Technical Data GFE Subtotal Support

Remarks:

R-1 SHOPPING LIST - Item No. 55 - 9 of 55 - 19

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 9 of 19)

UNCLASSIFIED

								DATE:				
Exhibit R-3 Cost Analysis (page 2)	e 2)									February 2000	00	*
APPROPRIATION/BUDGET ACTIVITY	<u></u>	PROGRAM ELEMENT	LEMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E, N BA 4		Conventional Munitio	nal Munition	N609E090/su	7	Non-Nuclear I	Non-Nuclear Expendable Ordnance (NNEO)/K2299	dnance (NNEC)/K2299			
Cost Categories	Contract	Performina	Total		FY 99		FY 00		FY 01			
or System/Item				FY 99	_	FY 00	_	FY 01	Award	Cost to	Total	Target Value
						Cost		Cost	Date	Complete	Cost	of Contract
Test & Evaluation	П	NSWC DAHLGREN	0.150		VAR	0.375	VAR	0.000		CONT.	CONT.	ΑN
		NAWC CHINA LAKE	0.150	0.200	VAR	0.200	VAR	0.000		CONT.	CONT.	Ą
Operational Test &Evaluation		COMOPTEVFOR	0.400	0.148	VAR	0.000		0.000		0.000	0.548	ΑN
										!	11.00	
Subtotal T&E			0.700	0.498		0.575		0.000		CON .	CON .	
Remarks:												· ·
Contractor Engineering Support												
Government Engineering Support	WR	NSWC DAHLGREN	0.141	0.198	11/98	0.200	11/99	0.000		CONT	CONT.	ΑN
Program Management Support		NSWC DAHLGREN	0.054	0.080	11/98	0.080	11/99	0.000		CONT	CONT.	ΑN
Travel		NSWC DAHLGREN	0.010	0.010		0.010						
Labor (Research Personnel)												
Overhead	WR	NSWC DAHLGREN	0.010	0.010		0.010						
Subtotal Management			0.215	0.298		0.300		0.000		CONT	CONT.	Ψ.N
Remarks:												
Total Cost			1.732	2.250		1.353		0.867		CONT.	CONT.	N/A
Remarks:				-								

R-1 SHOPPING LIST - Item No. 55 - 10 of 55 - 19

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 10 of 19)

UNCLASSIFIED

APPROPRIATION/BUDGET ACTIVITY PROGRAM ELEMENT N						DAIE	Febr	February 2000	
Convention	MENT NAME Munitions	ELEMENT NAME AND NUMBER onal Munitions/0603609N	R	PROJECT NAME AND NUMBER INSENSITIVE MUNITIONS ADVA	ME AND NUM MUNITIONS A	PROJECT NAME AND NUMBER INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT / S0363	VELOPMENT	1/ 50363	
COST (\$ in Millions) FY 1991	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004		FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost 9.889	9.889	9.121	3.224	7.398	4.804	6.392	4.668	Continuing Continuing	Continuing
RDT&E Articles Qty									

A. (U) Mission Description and Budget Item Justification:

This program will provide, validate and transition technology to all new weapon developments and priority weapon systems and enable production of munitions insensitive to propulsion units, explosives, warheads, fuzes and pyrotechnics to reduce the severity of cook-off and bullet/fragment impact reactions, minimizing the probability for sympathetic detonation, both in normal storage and in use, increasing ship survivability and satisfying performance and readiness requirements. Each technology area is divided into subtasks addressing specific munition/munition class IM deficiencies. Energetic materials producibility is demonstrated to assure national capability to produce and load munitions systems. The program is being closely coordinated with other Military Departments, NATO and allied countries to eliminate redundant efforts and maximize efficiency. A joint service IM requirement has been developed. Insensitive munitions are identified as a DoD critical technology requirement and considered as part these stimuli with no reduction in combat performance. The Insensitive Munitions (IM) Advanced Development Program is the Navy's focused effort on propellants, Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet impact, thus presenting a great hazard to ships, aircraft and personnel. of a weapon design per DoD 5000.2R.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1999 ACCOMPLISHMENTS:

- (U) (\$1.892) Validated and assessed weapon systems POA&Ms for IM compliance. Compiled and analyzed weapon system, energetic material and generic technology IM test data.
- performance deformable high explosives for new Anti-Air-Warfare Warheads. Demonstrated internal blast explosive and high performance pressed metal accelerating - (U) (\$3.118) Demonstrated high explosives that show improved IM characteristics while maintaining or improving operational performance. Demonstrated improved explosives and initiated qualification. Continued evaluation of a castable CL-20 based explosive and qualified low cost metal accelerating explosive.

R-1 SHOPPING LIST - Item No. 55 - 11 of 55 - 19

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 11 of 19)

UNCLASSIFIED

EXHIB	EXHIBIT R-2a, RDT&E Project Justification	DATE:
		February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N BA4	Conventional Munitions/0603609N	INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT / S0363

1. (U) FY 1999 ACCOMPLISHMENTS: (Continued)

- (U) (\$0.825) Evaluated IM ordnance concepts. Conducted system demonstrations of new high explosives combined with improved warhead and booster designed to support technology transitions. Continued modeling applications that reduce and enhance IM warhead design and test efforts. Evaluated improved air-to-air warheads and penetrator warheads. Evaluated IM properties of warheads reactive case materials. Demonstrated improved submunition case concepts.
- (U) (\$4.054) Evaluated and demonstrated IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combined candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Demonstrated performance of super high-pressure composite case motor. Demonstrated insensitive high-energy booster propellants and composite case motors. Continued demonstration of dual-pulse boost rocket motor for surface systems.

2. (U) FY 2000 PLAN:

- (U) (\$1.810) Continue validation and assessment of weapon systems POA&Ms for IM compliance. Continue compilation and analysis of weapon system, energetic material and generic technology IM test data.
 - (U) (\$2.320) Demonstrate high explosives that show improved IM characteristics while maintaining or improving operational performance. Demonstrate high performance cast explosive. Continue qualification and evaluation of internal blast explosive and pressed metal accelerating explosives. Continue evaluation of improved performance deformable explosive. Begin qualification of high performance, low cost replacement for initiator explosives. Begin qualification of high performance booster explosive.
- (U) (\$0.705) Evaluate IM ordnance concepts. Conduct system demonstrations of new high explosives combined with improved warhead and booster designed to support technology transitions. Continue modeling applications that reduce and enhance IM warhead design and test efforts. Complete evaluation of improved warhead concepts for shoulder launched weapons. Continue demonstration and evaluation of improved air-to-air warheads, reactive case warheads and penetrator warheads. Continue demonstration and evaluation of improved submuntion case concepts.
- (U) (\$3.286) Evaluate and demonstrate IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combine candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Demonstrate an insensitive, multi mission, high performance rocket motor. Demonstrate high-pressure propellants in high-pressure composite motor cases. Continue demonstration of dual-pulse boost rocket motor for surface systems.
- (U) (\$1.000) Continue the evaluation and demonstration of solventless processing of explosive molding powder. Demonstate the recycle, recovery and reuse of hydrolyzable rocket propellant formulations. Evaluate and predict the environmental impact and associated life cycle costs for energetic materials and processes.

R-1 SHOPPING LIST - Item No. 55 - 12 of 55 - 19

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 12 of 19)

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	יייבמי יום ימד ו יוספטי מפאוויסמיסיי	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	_
RDT&E, N BA4	Conventional Munitions/0603609N	INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT / S0363	

- 3. (U) FY 2001 PLAN:
- (U) (\$1.209) Continue validation and assessment of weapon systems POA&Ms for IM compliance. Continue compilation and analysis of weapon system, energetic material and generic technology IM test data.
 - (U) (\$.750) Demonstrate high explosives that show improved IM characteristics while maintaining or improving operational performance. Continue qualification of internal blast explosive. Continue evaluation of pressed metal accelerating explosives. Continue qualification and begin transition high performance booster explosive to weapons systems.
- (U) (\$1.265) Evaluate and demonstrate IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combine candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Continue demonstration of an insensitive, multi-mission, high performance rocket motor. Complete demonstration of high-pressure propellants in high-pressure composite motor cases. Complete demonstration of dual-pulse boost rocket motor for surface systems.
- B. (U) OTHER PROGRAM FUNDING SUMMARY: NOT APPLICABLE
- PE 0601153N (Defense Research Sciences)
- PE 0602111N (Surface/Aerospace Surveillance and Weapons Technology) (U) RELATED RDT&E: (U) PE 0601153N (Defens (U) PE 0602111N (Surface)
 - PE 0602314N (Undersea Surveillance and Weapons Technology)
 - PE 0602315N (MCM, Mining and Special Warfare Technology) 33
- (U) PE 0603216N (Aviation Survivability) Project W0592 Aircraft and Ordnance Safety
 (U) PE 0604603N (Unguided Conventional Air-launched Weapons)
 (U) Cooperative technology transfer efforts with all weapons project offices are in progress.
- C. (U) ACQUISITION STRATEGY: NOT APPLICABLE
- D. (U) SCHEDULE PROFILE: NOT APPLICABLE

R-1 SHOPPING LIST - Item No. 55 - 13 of 55 - 19

(Exhibit R-2a, page 13 of 19) Exhibit R-2a, RDT&E Project Justification

UNCLASSIFIED

							_	DATE:				
Exhibit R-3 Cost Analysis (page 1)	-									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	<u></u>	PROGRAM	PROGRAM ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	(BER				
RDT&E, N BA4		Convent	Conventional Munition	itions/0603609N	z	INSENSITIV	/E MUNITIC	NS ADVAN	CED DEVEL	NSENSITIVE MUNITIONS ADVANCED DEVELOPMENT / S0363	363	
Cost Categories	Contract	Contract Performing	Total		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Activity &	PΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Propulsion Dev. and Eval.	WR	NAWC WPN DIV/China Lake	Lake 75.700	3.554	11/98	2.786	11/99	1.265	11/00	Continuing	Continuing	Ą
	RCP	NAWC WPN DIV/China Lake	Lake 9.000	0.500	11/98	0.500	11/99	0.000	11/00	Continuing	Continuing	ΝΑ
Explosives Dev. and Eval.	WR	NSWC/Indian Head Div	59.646	3.098	11/98	2.300	11/99	0.740	11/00	Continuing	Continuing	NA
Ordnance Dev. and Eval.	WR	NSWC/Dahlgren Div	17.550	0.825	11/98	0.705	11/99	0.000	11/00	Continuing	Continuing	NA
Pyrotechnics Dev. and Eval.	WR	NSWC/Crane Div	6.500	0.020	11/98	0.020	11/99	0.010	11/00	Continuing	Continuing	ΝΑ
Environmentally Safe Energetics Dev	WR	NSWC/Indian Head Div	0.000	0000	NA	1.000	ΑN	0.000	11/00	0.000	1.000	NA
Subtotal Product Development			168.396	7.997		7.311		2.015		Continuing	Continuing	Ϋ́

Remarks: This cost category includes technology development and subsequent test and evaluation of Insensitive Munitions concepts for propulsion, explosives, ordnance and pyrotechnics. Development of Environmentally Safe Energetic Materials will transition to S0363 in FY 00.

Development Support Equipment							
Software Development							
Training Development							
Integrated Logistics Support							
Configuration Management							
Technical Data		:					
GFE							
Subtotal Support	0.000	0.000	0.000	0.000	0.000	0.000	

Remarks: Support categories not applicable to this Non-ACAT program.

R-1 SHOPPING LIST - Item No. 55 - 14 of 55 - 19

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 14 of 19)

UNCLASSIFIED

									DATE:				
Exhibit R-3 Cost Analysis (page 2)	(2)										February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	_	d	PROGRAM ELEMENT	(ENT			PROJECT N	PROJECT NAME AND NUMBER	MBER				
RDT&E. N		<u> </u>	Conventional Munition	Munition	ns/0603609N	_	INSENSIT	IVE MÜNTIC	DNS ADVAN	CED DEVE	INSENSITIVE MUNTIONS ADVANCED DEVELOPMENT / SO363	163	
ies	Contract Performing	erforming	Total			FY 99		FY 00		FY 01			
r System/Item	Method Activity &	Activity &	PYs		FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
	& Type Location	ocation.	Cost		Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Developmental Test & Evaluation													
Operational Test & Evaluation													
Tooling													
GFE													
Subtotal T&E				0.000	0.000		0.000		0.000		0.000	0.000	

Remarks: This project, S0363, Insensitive Munitions Advanced Development (IMAD), is a Non-ACAT program. As such no formal, separate developmental or operational test and evaluation plans or efforts are included. Formal DT and OT is conducted once the concepts developed by IMAD are transitioned to weapon development and product improvement programs.

Contractor Engineering Support										0.000	
Government Fnaineering Support										0.000	
Program Management Support	NSWC IH DIV	23.867	1.876	11/98	1.790	11/99	1.189	11/00	Continuing	Continuing	NA
Travel	NAVSEASYSCOM	0.190	0.016	10/98	0.020	10/99	0.020	10/00	Continuing	Continuing	NA
l abor (Research Personnel)										0.000	
Overhead										0000	
Subtotal Management		24.057	1.892		1.810		1.209		Continuing	Continuing	ΑN

Remarks:

Total Cost

Remarks: Performing activities include: NSWC/INDIAN HEAD, NAWC WP DIV/CHINA LAKE AND NSWC/CRANE

R-1 SHOPPING LIST - Item No. 55 - 15 of 55 - 19

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 15 of 19)

Ν

Continuing

Continuing

9.121

9.889

192.453

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	ification				DATE:			
								Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM EL	EMENT NAME	ELEMENT NAME AND NUMBER	8.	PROJECT NAME AND NUMBER	ME AND NUM	BER			
RDT&E, N / BA4	Conventional Munitions/0603609N	al Munition	s/0603609N		ENVIRONMEN	TALLY SAFE	ENVIRONMENTALLY SAFE ENERGETIC MATERIALS / S2611	MATERIALS /	S2611	
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004		FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		0.968	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.968
RDT&E Articles Qtv										

A. (U) Mission Description and Budget Item Justification:

energetic materials is rapidly increasing. New technologies, energetic materials and ingredients that minimize any adverse environmental impact are being developed within The development, manufacture and demilitarization of energetic materials generate significant quantities of waste. The generation and subsequent disposal of this waste has come under increased scrutiny and regulation by Federal, State and local officials. Additionally, due to environmental compliance and waste disposal issues, the cost of the Navy's science and technology initiatives. These technologies are commonly referred to as "green" energetic materials. The efforts under this project will provide, validate, and transition technology for explosives, propellants and pyrotechnics using materials and compositions that have low adverse environmental impact in production and demilitarization, will meet insensitive munitions requirements and will have no reduction to combat performance.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1999 ACCOMPLISHMENTS:

- (U) (\$.968) Initiated the evaluation and demonstration of solventless processing of explosive molding powder. Began the demonstration of the recycle, recovery and reuse of hydrolyzable rocket propellant formulations. Initiated the evaluation and prediction of the environmental impact and associated life cycle costs for energetic materials and

2. (U) FY 2000 PLAN: NOT APPLICABLE

3. (U) FY 2001 PLAN: NOT APPLICABLE

R-1 SHOPPING LIST - Item No. 55 - 16 of 55 - 19

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 16 of 19)

UNCLASSIFIED

	EXHIBIT R-2a, RDT&E Project Justification	DATE:	
		February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N / BA4	Conventional Munitions/0603609N	ENVIRONMENTALLY SAFE ENERGETIC MATERIALS / S2611	
(2) (2) (3) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4			

- B. (U) OTHER PROGRAM FUNDING SUMMARY: NOT APPLICABLE
- (U) RELATED RDT&E:

- (U) PE 0601153N (Defense Research Sciences)
 (U) PE 0602111N (Surface/Aerospace Surveillance and Weapons Technology)
 (U) PE 0602314N (Undersea Surveillance and Weapons Technology)
 (U) PE 0602315N (MCM, Mining and Special Warfare Technology)
 (U) PE 0603216N (Aviation Survivability) Project W0592 Aircraft and Ordnance Safety
 (U) PE 0604603N (Unguided Conventional Air-launched Weapons)
- C. (U) ACQUISITION STRATEGY: NOT APPLICABLE
- D. (U) SCHEDULE PROFILE: NOT APPLICABLE

R-1 SHOPPING LIST - Item No. 55 - 17 of 55 - 19

(Exhibit R-2a, page 17 of 19) Exhibit R-2a, RDT&E Project Justification

CLASSIFICATION:

								DAI::				
Exhibit R-3 Cost Analysis (page 1)) (L ¢									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	<u></u>	PROGRAM	PROGRAM ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	1BER				
RDT&E, N / BA4		Conventi	Conventional Munition	N6098090/suo	z	ENVIRONME	ENVIRONMENTALLY SAFE ENERGETIC MATERIALS / S2611	: ENERGETIC	MATERIALS /	, S2611		
	Contract	Contract Performing	Total		FY 99		FY 00		FY 01			
or System/Item	Method	Activity &	ΡΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
	& Type	Location		Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
velopment	¥R	NSWC IH DIV	0.000	0.903	66/20	0.000	NA	0.000	NA	0.000	0.903	¥
Ancillary Hardware Development											0.000	
Systems Engineering											0.000	
Licenses											0.000	
Tooling											0:000	
DET.											0000	
Award Fees											0.000	
Sultatal Product Development			0000	0.903		0000		0.000		0.000	0.903	
Remarks:												
Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: Categories do not apply.												

R-1 SHOPPING LIST - Item No. 55 - 18 of 55 - 19

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 18 of 19)

UNCLASSIFIED

Exhibit R-3 Cost Analysis (page 2)											5	
VIII A TITAL										February 2000	3	
UDGE! ACTIVITY		PROGRAM ELEMENT	LEMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E, N / BA4		Convention	Conventional Munitions/0603609N	18/0603609P	7	ENVIRONME	ENVIRONMENTALLY SAFE ENERGETIC MATERIALS / S2611	ENERGETIC	MATERIALS /	/ \$2611		
	_								FY 01			
(Tailor to WBS, or System/Item Method Requirements)	Activity &		PY s Cost	FY 99 Cost	Award	FY 00 Cost	Award Date	FY 01 Cost	Award	Cost to Complete	Total	Target Value of Contract
Developmental Test & Evaluation	Т											
Operational Test & Evaluation												
			0.000	0.000		0.000		0.000		0.000	0.000	
Contractor Engineering Support												
Program Management Support WR	NSWC IH DIV	VIC	0.000	0.065	07/99	0.000	ΑN	0.000	¥	0:000	0.065	
Labor (Research Personnel)												
Subtotal Management			0.000	0.065		0.000		0.000		0.000	0.065	
			0:000	0.968		0.000		0.000		0000	0.968	

R-1 SHOPPING LIST - Item No. 55 - 19 of 55 - 19

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 19 of 19)

RDT&E BUDGET ITEM J	EM JUS	TIFICA	USTIFICATION SHEET (R-2 Exhibit)	HEET (R	-2 Exhil	bit)		DATE	JAN 2000	
виреет Астіvity 4 - Demonstration/Validation			PE NU 060 Veh	PE NUMBER AND TITLE 0603611M Mari Vehicles	пт∟Е Лarine C c	orps Ass	PE NUMBER AND TITLE 0603611M Marine Corps Assault Amphibious Vehicles	hibious	.	РРОЈЕСТ В0020
COST (In Millions)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
ADVANCED AMPHIBIOUS ASSAULT VEHICLE (AAAV)	0	100609	114210	137981	178680	158817	103432	61373	61373 Continuing	CONT.
Quantily of RDT&E Articles		1	2			11				

A. (U) Mission Description and Budget Item Justification:

(U) The AAAV program will field a successor to the Marine Corps current amphibious vehicle, the AAV7A1. The AAAV will provide the principle means of tactical surface mobility for the Marine Air-Ground Task Force (MAGTF) during both ship-to-objective maneuver and subsequent combat operations ashore as part of the Navy and Marine Corps Operation Maneuver from the Sea Doctrine. The AAAV will provide the Marine Corps with the capability to execute the full spectrum of military missions from humanitarian operations to conventional combat operations. The AAAV replaces the AAV7AI family of vehicles. (U) Justification for Budget Activity: The AAAV Program was approved by the Defense Acquisition Board (DAB) at a Milestone I review in 1995 signifying the beginning of the Program Definition and Risk Reduction (PDRR) phase. During this phase, three (3) prototypes will be designed, fabricated, and undergo Development and Operational testing.

(U) FY 1999 Accomplishments:

•	\$ (D) •	91408	91408 Continued PDRR phase, initiated and completed the assembly of the first prototype, initiated extensive contractor prototype testing. Initiated AAAV Command (C) System development. Initiated second and third prototype assembly. Continued AAAV Survivability program.
•	(U) \$	3887	Continued to provide in-house technical support.
•	\$ (n)	4570	Continued to provide progr
•	• (U) \$	744	Independent vertification and variation (1 $\sqrt{\alpha}$ V). Initiated armor validation testing. Initiated combined government/contractor prototype acceptance testing.

(U)Total \$ 100609

(Exhibit R-2, Page 1 of 6)

Budget Item Justification

R-1 Line Item 56

RDT	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	N SHEET (R	-2 Exhibit)	<u>a</u>	DATE JAN 2000	
вирсет АСТІVITY 4 - Demonstration/Validation	alidation	PE NUMBER AND TITLE 0603611M Mari Vehicles	пге Iarine Corps	PE NUMBER AND TITLE 0603611M Marine Corps Assault Amphibious Vehicles		РРОЈЕСТ В0020
(U) FY 2000 Planned Program:	gram:					
• (U) \$ 92880	Continue PDRR phase. Complete assembly of second and third prototypes. Complete extensive contractor testing of all three prototypes. Continue AAAV (C) system development. Continue AAAV Survivability program.	1 and third prototyp AAAV Survivabili	es. Complete ext	ensive contractor test	ing of all three prototype	•
• (U) \$ 10233 • (U) \$ 5379	Continue to provide in-house technical support. Continue to provide program support to coordinate and update program planning, program analysis, and program execution. Continue software	ıd update program p	lanning, program	analysis, and progra	m execution. Continue so	tware
• (U) \$ 5718 (U)Total \$ 114210	INCV. Initiate and complete combined government/contractor Developmental Testing-I (DT-I), Initiate Early Operational Assessment (EOA) testing,	or Developmental T	esting-I (DT-I),	Initiate Early Operati	onal Assessment(EOA) t	sting,
(U) FY 2001 Planned Program: (U) \$ 24497 Com (U) \$ 93851 Tran (U) \$ 12376 Cont (U) \$ 5401 Cont (U) \$ 1856 Com (U) Total \$ 137981	Complete PDRR phase. Continue AAAV (C) system and survivability development. Transit Milestone II DAB; award the Engineering and Manufacturing Development contract. Continue to provide in-house technical support. Continue to provide program support to coordinate and update program planning, program analysis, and program execution. Continue software IV&V. Complete Early Operational Assessment testing.	n and survivability of Manufacturing De I Manufacturing of I Manufactu	levelopment. velopment contra lanning, progran	ct. ı analysis, and progra	m execution. Continue s	ftware
B. (U) Project Change Summary	mmary	FY 1999	FY 2000	FY 2001		
(U) Previous President's Budget(U) Adjustments to Previous President's Budget(U) Current Budget Submit	udget 1s President's Budget t	103966 -3357 100609	94843 19367 114210	110584 27397 137981		
(U) Change Summary Explanation:	anation:					
(U) Funding: FY 1999 DoD General Reduction of \$633 NavCompt adjustment of \$362K	eflects SBIR assessment of sk. FY 2001 reflects a \$28	ompt adjustment of prioritization of prc	\$474K. FY 200 grams within the) reflects a Congressi Marine Corps, a PBI	\$2,883M and, a NavCompt adjustment of \$474K. FY 2000 reflects a Congressional increase of \$20M and a .7M adjustment due to prioritization of programs within the Marine Corps, a PBD 604 adjustment of \$941K and a	id a K and a

(Exhibit R-2, Page 2 of 6)

Budget Item Justification

R-1 Line Item 56

RDT&E BUDGET ITEM JUSTIFICATION	USTIFICATION SHEET (R-2 Exhibit)	DATE JAN 2000	000
вирсет АстіvітУ 4 - Demonstration/Validation	PE NUMBER AND TITLE 0603611M Marine Corps Assault Amphibious Vehicles	mphibious	PROJECT B0020
(U) Schedule: Not applicable.			
(U) Technical: Not applicable.			
C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN) (U) PANMC, BLI# 147500, AAAV (U) PMC, BLI# 202200, AAAV	FY 2000 FY 2001 FY 2002 FY 2003 FY 2004 7026	FY 2005 17715 554221	To Total Compl Cost Cont. Cont.
(U) Related RDT&E			
(U) PE 0206623M (Marine Corps Ground Combat/Supporting Arms Systems), Project C0021, AAV7A1. (U) PE 0206623M (Marine Corps Ground Combat/Supporting Arms Systems), Project C2237, AVTB.	ect C0021, AAV7A1. ect C2237, AVTB.		
R-1	R-1 Line Item 56	Budget Item Justification	on
		(Exhibit R-2, Page 3 of 6)	(9

(Exhibit R-2, Page 3 of 6)

PROJECT B0020 **JAN 2000** Budget Item Justification (Exhibit R-2, Page 4 of 6) 0603611M Marine Corps Assault Amphibious DATE RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) PE NUMBER AND TITLE AAAVs Delivered 12 27 62 200 200 200 200 112 1,013 912 FOC 5 Fiscal Year FY95 FY96 FY97 FY98 FY99 FY00 FY01 FY02 FY03 FY04 FY05 FY06 FY07 FY08 FY09 FY10 FY11 FY12 R-1 Line Item 56 Vehicles AAAV Program Schedule Full Rate Production Deliveries Full Rate Contract Award LRIP Contract Award Live Fire Testing Prototype Testing Fabricate 11 E&MD Prototypes Prototype Testing Ballistic Hull & Turret Fabricate 3 PDRR Prototypes 4 - Demonstration/Validation D. (U) Schedule Profile AAAV Schedule: **BUDGET ACTIVITY**

UNCLASSIFIED

RD	T&E PROG	RAM EL	EMENT/PF	OJECT	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DOWN (R-:	3)	DATE	JAN 2000	C
вирсет астіvіту 4 - Demonstration/Validation	ıtion/Validat	ion			PE NUMBER AND TITLE 0603611M Marine Corps Assault Amphibious Vehicles	E rine Corps A	ssault Am	phibious		РRОЈЕСТ В0020
A. (U) <u>Project Cost Breakdown</u> Product Development Support and Management Test and Evaluation Total	st Breakdown int ement				FY 1999 91408 8457 744 100609	FY 2000 92880 15612 5718 114210	FY 2001 118348 1777 1856 137981			
B. Budget Acquisition History and Planning Information	tion History and	d Planning Inf	<u>ormation</u>							
Performing Organizations Contractor or Contra Government Metho Performing or Fur Activity Vehicle	izations Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Performing Activity <u>EAC</u>	Project Office <u>EAC</u>	Total Prior to FY 1999	FY 1999	FY 2000	FY 2001	Budget to Complete	Total <u>Program</u>
GDLS (PDRR) CPAF J EMD award	CPAF	JUN 96 FEB 01	CONT.	CONT.	125307	91408	92880	24497 93851	CONT.	CONT.
Support and Management Organizations	igement Organi	zations								
EG&G, Manassas,	FFF	SEP 98	CONT.	CONT.	640	3153	4247	4366	CONT.	CONT.
VA Misc. Contracts Misc. Gov. labs Modeling & Simulation	CPFF WR WR	Various Various Various	CONT. CONT. CONT.	CONT. CONT. CONT.	6385 10620 3330	1292 3887 125	1085 9980 300	1045 12066 300	CONT. CONT. CONT.	CONT. CONT. CONT.
Test and Evaluation Organizations Miscellaneous Various	on Organizations Various	s Various	CONT.	CONT.	1285	744	5718	1856	CONT.	CONT.
				Ŗ	R-1 Line Item 56		Bu	Budget Item Justification	ıstification	
							, ,		Š	

(Exhibit R-3, Page 5 of 6)

RDT&E PROGRAM ELEMENT/PR	T/PROJECT COST BREAKDOWN (R-3)	KDOWN (R-:	<u>@</u>	DATE	JAN 2000	
BUDGET ACTIVITY 4 - Demonstration/Validation	PE NUMBER AND TITLE 0603611M Mari Vehicles	PENUMBER AND TITLE 0603611M Marine Corps Assault Amphibious Vehicles	ssault Am	snoidihqu		РРОЈЕСТ В0020
Government Furnished Property Contract Method/Type Award or Item or Funding Obligation Delivery Description Vehicle Date Date Product Development Property	Total Prior to <u>FY 1999</u>	FY 1999	FY 2000	FY 2001	Budget to Complete	Total
Support and Management Property						
Test and Evaluation Property						
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation Total Project	Total Prior to FY 1999 125307 20975 1285	FY 1999 91408 8457 744 100609	FY 2000 92880 15612 5718 114210	EY 2001 118348 17777 1856 137981	Budget to Complete CONT. CONT. CONT.	Total Program CONT. CONT. CONT.
	R-1 Line Item 56		Bu	Budget Item Justification	ıstification	
			Œ,	(Exhibit R-3 Page 6 of 6)	ane 6 of 6)	

(Exhibit R-3, Page 6 of 6)

RDT&E BUDGET ITEM JUS	USTIFICATION SHEET (R-2 Exhibit)	TION SH	HEET (R	-2 Exhil	bit)		DATE Fet	February 2000	00
вирсет АСТІVITY 4 - Demonstration/Validation		PE NU 060 Cor	PE NUMBER AND TITLE 0603635M Mari Combat/Suppor	PENUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	orps Gro	und stems			
COST (In Millions)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	54971	50375	23216	8682	7516	2816	2564	Continuing	Continuing
C1964 Anti-Armor Weapon System	424	629	613	635	865	793	529	Continuing	Continuing
C2112 Howitzer, Medium Towed 155MM (LW 155)	31763	27117	13119	0	0	0	0	0	142633
C2113 Predator Short Range Assault Weapon	14727	10681	492	0	0	0	0	0	143312
C2251 Jt Adv Amphibious Logistics Technology	+	0	0	0	0	0	0	0	-
C2256 Integrated Infantry Combat System (IICS)	309	747	909	1749	1766	1782	1795	Continuing	Continuing
C2507 Small Unit Riverine Craft (SURC)	0	3021	1757	225	10	0	0	0	5003
C2508 Internally Transportable Vehicle	0	5196	0699	6073	4875	241	240	130	23385
C2614 SMAW Follow-On	2905	2984	0	0	0	0	0	0	5889
C2615 Trajectory Corrected Munitions (TCM)	4842	0	0	0	0	0	0	0	4842
Quantity of RDT&E Articles									

(U) Mission Description and Budget Item Justification: This PE supports the demonstration and validation of Marine Corps Ground/Supporting Arms Systems for utilization in Marine Air-Ground Expeditionary Force amphibious operations.

(U) Justification for Budget Activity: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ground weapon system applications

R-1 Line Item 58

Budget Item Justification

(Exhibit R-2, Page 1 of 28)

RDT&E BUDGET ITEM JUS	JUSTIFICATION SHEET (R-2 Exhibit)	TION SE	HEET (R	-2 Exhil	bit)		DATE Fet	February 2000	00
вирсет Астипу 4 - Demonstration/Validation		PE N 060 Col	PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	n⊤∟E flarine Cc porting /	orps Grou Arms Sys	und stems		.	Р R ОЈЕСТ С1964
COST (in Millions)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C1964 Anti-Armor Weapon System	424	629	613	635	865	793	529	Continuing	Continuing
Quantity of RDT&E Articles									
A. (U) Mission Description and Budget Item Justification: (U) This project provides for Marine Corps participation in the Joint Anti-Armor Program entitled Javelin (Advanced Anti-Tank Weapon System - Medium (AAWS-M)) and the Anti-Armor Weapon System - Heavy (AAWS-H). The Javelin weapon system will provide the Marine Corps and Army with state-of-the-art capability to destroy sophisticated and future armored threats. No such medium anti-armor system is currently available to the infantryman. The AAWS-H is a long range, antitank weapon system that will replace the Tube Launched, Optically Tracked, Wire Guided Missile System. It will satisfy an operational requirement to provide increased range (4000 meters), increased lethality against all armored threats, to include explosive reactive armor, active protection, increased probability of hit and kill and increased gunner survivability. Possible Light Armored Vehicle-Anti Tank usage would promote commonality among Marine Corps systems.	in the Joint Anti-Armor Program entitled Javelin (Advanced Anti-Tank Weapon System - Medium (AAWS-M)) The Javelin weapon system will provide the Marine Corps and Army with state-of-the-art capability to destroy 1 anti-armor system is currently available to the infantryman. The AAWS-H is a long range, antitank weapon cked, Wire Guided Missile System. It will satisfy an operational requirement to provide increased range (4000 nclude explosive reactive armor, active protection, increased probability of hit and kill and increased gunner usage would promote commonality among Marine Corps systems.	mor Progra on system v n is currently Missile Systeactive armoor	m entitled Ja vill provide ti y available to stem. It will or, active pro nality among	velin (Adva he Marine C the infantry satisfy an of tection, incr	nced Anti-Ta orps and Arr man. The A perational re eased probal ps systems.	ank Weapon ny with state LAWS-H is s quirement to oility of hit a	System - Me -of-the-art c I long range, provide incr nd kill and ii	edium (AAV apability to antiank we cased range ncreased gu	VS-M)) destroy apon (4000 mer
 (U) FY 1999 Accomplishments: (U) \$\\$ 200 Monitored and participated in Production Qualification Test (PQT) & Preplanned Product Improvement (P3I) for Javelin by using Engineering/Technical Support. (U) \$\\$ 196 Monitored and participated in advancing technical developments in the AAWS-H program by using Engineering / Technical Support. (U) \$\\$ 28 Prepared necessary Marine Corps documentation for the AAWS-H program. (U) Total \$\\$ 424 	Production Qualification Test (PQT) & Preplanned Product Improvement (P3I) for Javelin by using rt. advancing technical developments in the AAWS-H program by using Engineering / Technical Suprorps documentation for the AAWS-H program.	fication Test al developn n for the AA	(PQT) & Pr nents in the / \WS-H prog	eplanned Pro AAWS-H pr ram.	oduct Improv ogram by us	vement (P3I)) for Javelin ring / Techn	by using ical Support	
 (U) FY 2000 Planned Program: (U) \$ 237 Engineering/Technical support to monitor and participate in PQT and P3I for the Javelin program. (U) \$ 368 Engineering and Technical Support to monitor and participate in technical developments in the AAWS-H program. (U) \$ 24 Prepare necessary Marine Corps documentation for the AAWS-H program. (U)Total \$ 629 	nonitor and p t to monitor a ocumentation	articipate in ind participa for the AA	. PQT and P3 ite in technic WS-H progra	I for the Jav al developm ım.	elin program ents in the A	ı. AWS-H pro	gram.		
		R-1 Line Item 58	Item 58			Budç	Budget Item Justification	stification	

(Exhibit R-2, Page 2 of 28)

RDT&E BUDGET ITEM J		USTIFICATION SHEET (R-2 Exhibit)	T (R-2 E)	chibit)		DATE Febr	February 2000
BUDGET ACTIVITY 4 - Demonstration/Validation		PE NUMBEI 060363 Comba	PE NUMBER AND TITLE 0603635M Marine Combat/Supporti	PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	und		PROJECT C1964
(U) FY 2001 Planned Program: • (U) \$ 243 Engineering/Tecnhical support • (U) \$ 335 Engineering/Technical support • (U) \$ 35 Prepare necessary Marine Corp (U)Total \$ 613	ram: Engineering/Tecnhical support to monitor and participate in PQT and P3I for the Javelin program. Engineering/Technical support to monitor and participate in technical developments in the AAWS-H program. Prepare necessary Marine Corps documentation for the AAWS-H program.	to monitor and participate in PQT and P3I for the Javelin program, to monitor and participate in technical developments in the AAWS s documentation for the AAWS-H program.	and P31 for the ical developm program.	s Javelin progran ents in the AAW	n. 'S-H program.		
B. (U) Project Change Summary	<u>FY 1999</u>	9 <u>FY 2000</u>	FY 2001	<u>01</u>			
(U) Previous President's Budget(U) Adjustments to Previous President's Budget(U) Current Budget Submit	427 -3 424	7 633 3 -4 4 629		610 +3 613			
(U) Change Summary Explanation: (U) Funding: Changes in all fiscal years are due to minor affordability adjustments.	due to minor affordabili	ity adjustments.					
(U) Schedule: N/A							
(U) Technical: N/A							
C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN) *(U) PMC BLI# 301100 (U)	FY 1999 FY 2000 82,653 92,737	FY 2001 FY 29,119	FY 2002 FY 2003 1,033 1,047	2003 FY 2004 1,047 113	FY 2005	To Compl 0	Total <u>Cost</u> 302,792
(U) Related RDT&E					ر		
		R-1 Line Item 58	28		Budge	Budget Item Justification	ication

(Exhibit R-2, Page 3 of 28)

RDT&E BUDGET ITEM JUSTIFICAT	USTIFICATION SHEET (R-2 Exhibit)	DATE February 2000
вирсет АстіvітУ 4 - Demonstration/Validation	PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	PROJECT C1964 S
D. (U) Schedule Profile		
JAVELIN SCHEDULE		
1995 Task Name	4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4	
Operational Testing:		
Independent Evaluation Report (IER)		
Live Fire Test & Evaluation Report (LFT&ER)		
CONTRACTING PREPARATION		
Contracting		
PRODUCTION & FIELDING		
PROGRAM CONTROL	P	
MS III APPROVAL	•	
Contract Award	\$ 5/5	
FULL-RATE PRODUCTION & FIELDING		
Multi-year II (Four-Year) Production Contract Award	72/27	
Year I Production and Delivery:		
	R-1 Line Item 58	Budget Item Justification

(Exhibit R-2, Page 4 of 28)

RDT&E BUDGET ITEM J	TEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY 4 - Demonstration/Validation	PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	PROJECT C1964
Task Name	1997	
TOW Service I ife Extension Program Cost Study		
TOW Fire and Forget Participation		
US Amy Missile Modernization Working Group		
SET Cost as Independent Variable Objectives		
Develop Operational Requirement Document		
AAWS-H ANALYSIS OF ALTERNATIVES		
Establish Initial Acquisition Program Baseline		
ESTABLISH ACQUISITION STRATEGY		
DETERMINE PHASE I EXIT CRITERIA		
MILESTONE I	4 2/2	
US Army Common Modular Missile Tech Assistance		
Counter APS Development		
Begin WSESRB Activities		
Begin Test and Evaluation Master Plan Process		
Begin Developmental Test Evaluation		
	R-1 Line Item 58 Bt	Budget Item Justification

(Exhibit R-2, Page 5 of 28)

RDT&E BUDGET ITEM JUS	USTIFICATION SHEET (R-2 Exhibit)	TION S	HEET (R	≀-2 Exhi	bit)		DATE FeI	February 2000	000
вирдет астіvіту 4 - Demonstration/Validation		PE NO 060 Col	PE NUMBER AND TITLE 0603635M Mari Combat/Suppor	PENUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	orps Gro Arms Sy	und stems		d	РРОЈЕСТ С2112
COST (In Millions)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2112 Howitzer, Medium Towed 155MM (LW 155)	31763	27117	13119	0	0	0	0	0	142633
Quantity of RDT&E Articles									

Marine Corps and Army program, with the Marine Corps as the Lead service. The Joint Operational Requirements Document (JORD) was approved by the Assistant Commandant of the Marine Corps on 27 June 1996. The JORD was validated and approved by the Army on 29 September 1995. A MS I/II Marine Corps Program Decision Memorandum (MCPDM) was approved on 5 February 1996. After a ten month "shoot-off" between competitors a three year EMD contract was signed with Cadillac Gage reduction significantly improves transportability and mobility by sea, air, and land platforms and enables the LW155 to emplace, displace, and bold shift in half the time of Textron Inc. on 17 March 1997. On 21 December 1998, the three parties involved in the development of the LW155 signed a novation agreement whereby Vickers Shipbuilding and Engineering Limited (VSEL) took over prime contractor responsibilities from Cadillac Gage Textron. The program will complete development in FY01 the current system while increasing the rate of fire. Thus, the LW155 provides greater transportability and mobility in strategic/tactical movements. The LW155 is a joint A. (U) Mission Description and Budget Item Justification: (U) The LW155 is the replacement for the aging, operationally deficient M198 155 Howitzer for the Marine Corps and the Army. The LW155 retains the current M198 howitzer's range, but will weigh 9,000 pounds compared to the M198's 16,000 pounds. The weight and enter production in FY 02.

(U) FY 1999 Accomplishments:

(Exhibit R-2, Page 6 of 28)

Budget Item Justification

R-1 Line Item 58

	RDT	RDT&E BUDGET ITEM JUSTIFICATIO	USTIFICATION SHEET (R-2 Exhibit)	DATE February 2000
BUDGET 4 - De	вирдет Астилту 4 - Demonstration/Validation	alidation	PENUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	PROJECT I C2112 ns
(U) FY 2000 (U) \$ (U) \$ (U) \$ (U) Total \$	(U) FY 2000 Planned Program: (U) \$ 3,035 Prog. (U) \$ 2,556 ARU (U) \$ 16,094 Eng 527 Prov. (U) \$ 3,461 Con table (U) \$ 1,444 Con (U) Total \$ 27,117	ram: Program management support. ARDEC continues matrix development engineering to system, logistics, safety, quality assurance, corrosion prevention. Engineering and manufacturing development (EMD) contract increments to VSEL and Kara, Inc. Provide other government development engineering support to system, safety, logistics and quality assurance. Conduct technical test series (fatigue, recoil durability, cold, hot/humid, corrosion, transportability, logistics demonstration, spades, wear, firing tables). Conduct engineering and prototype manufacturing at Benet Labs and Watervliet Arsenal, NY.	to system, logistics, safety, quality assurance, corn) contract increments to VSEL and Kara, Inc. s support to system, safety, logistics and quality as ity, cold, hot/humid, corrosion, transportability, log at Benet Labs and Watervliet Arsenal, NY.	rosion prevention. ssurance. gistics demonstration, spades, wear, firing
(U) FY 200 • (U) \$ • (U) \$ • (U) \$ • (U) \$ (U) Total \$	(U) FY 2001 Planned Program: (U) \$ 2,000 Prog. (U) \$ 1,000 ARI (U) \$ 5,808 EMI 1,273 Prov. (U) \$ 2,638 Prov. (U) \$ 400 Con. (U) Total \$ 13,119	Program Management Support. ARDEC continues matrix development engineering to system, logistics, safety, quality assurance. EMD Contract increments (VSEL & KARA) to contract close out and final award fee. EMD contract increment development engineering support to logistics and quality assurance. Provide other government development engineering support to logistics and quality assurance. Provide support to Multi-service Operational Test & Evaluation (MOT&E) – Marine travel costs, transportation, materials. Conduct engineering and prototype manufacturing at Benet Labs and Watervliet Arsenal, NY.	to system, logistics, safety, quality assurance. ntract close out and final award fee. s support to logistics and quality assurance. E Evaluation (MOT&E) – Marine travel costs, transat Benet Labs and Watervliet Arsenal, NY.	sportation, materials.
		α	R-1 Line Item 58	Budget Item Justification

(Exhibit R-2, Page 7 of 28)

RDT&E BUDGET ITEM JUSTIF	ICATION	JUSTIFICATION SHEET (R-2 Exhibit)	۲-2 Exhit	oit)		DATE Febr	February 2000	00
вирсет АСТІVITY 4 - Demonstration/Validation		PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	тпс Marine Co pporting A	rps Grou Arms Sys	nd tems		£ 0	РRОЈЕСТ C2112
B. (U) Project Change Summary	FY 1999	FY 2000	FY 2001					
(U) Previous President's Budget(U) Adjustments to Previous President's Budget(U) Current Budget Submit	32,332 (569) 31,763	23,237 +3,880 27,117	12,105 +1,014 13,119					
 (U) Change Summary Explanation: (U) Funding: FY 1999 decrease of \$422K for SBIR Tax Assessment and \$147K Inflation Savings. FY2000 increase in the amount of \$3.03M due to \$1.5M (U) Funding: FY 1999 decrease of \$422K for SBIR Tax Assessment and \$430K additional spares, wear and firing table tests, \$1M for risk mitigation testing and reduced by \$150K for General Reduction. FY2001 increased by \$1.138M for unprogrammed operational test by MCOTEA and reduced by \$124K for PBD 604 (\$90K) and NAVCOMPT adjustment (\$34k). 	essment and \$ rol and \$430K ased by \$1.13	147K Inflation additional spar 8M for unprogra	Savings. FY20 ss, wear and fi immed operati	000 increase ring table tes onal test by]	in the amou ts, \$1M for MCOTEA a	nt of \$3.03M risk mitigation nd reduced by	due to \$1.5 n testing and y \$124K for	M I PBD
(U) Schedule: Change shows restructure of program								
(U) Technical: Not applicable								
C. (U) Other Program Funding Summary FY 1998 FY (APPN, BLI #, NOMEN)	FY 1999 FY 2000	000 FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
(U) PMC, BLI #218500, Howitzer, Medium Towed 155MM XM777 (LW 155)	0	0 11,105	90,055	197,065	142,352	238	0	440,815
(U) Related RDT&E: PE 0604854A (Artillery Systems-Engineering Development)	g Developmen	t)						
D. (U) Schedule Profile								

Budget Item Justification (Exhibit R-2, Page 8 of 28)

R-1 Line Item 58

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

February 2000

DATE

PROJECT **C2112**

BUDGET ACTIVITY
4 - Demonstration/Validation

PE NUMBER AND TITLE
0603635M Marine Corps Ground
Combat/Supporting Arms Systems

103.1 (EKBBI 1875; Pagge 9 4579) Badget Item Justification FY95 FY96 FY97 FY98 FY99 FY00 FY01 FY02 FY03 FY04 FY05 FY06 FY07 FY08 FY09 Total 🗲 🥦 ຊະດູ ເອດແຮ R&D for Both Services **Marines Fund Cannon** 273 Guns^{*} Army Funds TAD R&D XINTERTABILITIES TRAINED TO STRAIN **TAD Production** Deliveries PAT&E Schedule - Draft The Future of Towed Cannon Artillery 90.1 197.1 70 185 Engineering & Manufacturing Development Production... PQT/FAT TAD EMD Guns 1005-1008 Firing Mastoms Mobility Walningsmos **₹** Gun 003 Test
FAST bar
•MACS Firing Tables 155 Automated Howitzer Demo EMD Contrac RFPI ACTD 13.5 36.2 Shoot Off 14.4 6.3 SMC XM777 Prod
SMC XM777 Prod
SMC XM777 Quantities
SMC TAD Production
rmy TAD RDT (FY01 BES)
rmy XM777 Prod (FY01 BES)
rmy XM777 Prod (FY01 BES) ormal Solicitation Contract Award contract Award ilestones lestones pdated 01-12-00 **Jeliveries** eliveries elease 田る下 OT&E SMC RDTE Jases nases T&E

RDT&E	PROG	RDT&E PROGRAM ELEME		OJECT (SOST BE	REAKDC	NT/PROJECT COST BREAKDOWN (R-3)	3)	DATE FeI	February 2000
вирсет АСТІУІТУ 4 - Demonstration/Validation	Validati≀	uo			PE NUMBER AND TITLE 0603635M Mari Combat/Suppor	AND TITLE IM Marine /Supporti	PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	round Systems		PROJECT C2112
A. (U) Project Cost Breakdown	akdown			FY 1999		m FY~2000	FY 2001			
a. Primary Hardware Development b. Government Developmental Engineering c. Program Management Support d. Test and Evaluation	relopment nental Engir Support	eering		19,134 2,804 2,404 1,743		15,786 3,083 3,343 3,461	5,808 2,273 2,000 2,638			
e. Conduct Engineering and Prototype Manufacturing, Benet & Watervliet Arsenal, NY	nd Prototyp al, NY	e Manufacturi	ing,	5,678		1,444	400			
Total				31,763		27,117	13,119			
B. Budget Acquisition History and Planning Informatic	listory and	Planning Inf	ormation							
Performing Organizations Contractor or Contra	ations Contract									
	Method/Type	Award or	Performing	Project	Total				DudantTo	T- 1045
Activity Veh	or runding Vehicle	Obligation Date	EAC	EAC	FY 1999	FY 1999	FY 2000	FY 2001	Complete	Program
Product Development Organizations Cadiliac Gage CPIF	rganization F	ns Mar 1997	28,640	28,640	28,640	0	0	0	0	28,640
Textron, Inc, New Orleans, LA										
VSEL CPIF Barrow-in-	F	Dec 1998	35,612	35,612	1,224	17,734	13,186	5,188	0	37,332
Furness, UK Kara CPIF	[t-j	Apr 1999	2,491	2,491	0	1,400	2,600	620	0	4,620
Bedford, PA ARDEC, MIPR	9R	Oct 1996	12,115	12,115	5,337	2,256	2,556	1,000	0	11,149
ARDEC MIPR Picatinny, NJ	8	Oct 1996	4,494	4,494	4,494	• ,	0	0	0	4,494
Evaluation Board										
				.	R-1 Line Item 58	∞		B	Budget Item Justification	stification
								į	1 2 2	100 3

(Exhibit R-3, Page 10 of 28)

RD	RDT&E PROGRAM ELEME	RAM EL		NT/PROJECT	COST BREAKDOWN (R-3)	ZEAKDC	WN (R-3	(3	DATE Fe	February 2000
BUDGET ACTIVITY 4 - Demonstration/Validation	ıtion/Validati	on			PE NUMBER AND TITLE 0603635M Mari Combat/Support	AND TITLE IM Marine /Supporti	PENUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	round systems		PROJECT C2112
Contractor or Government Performing <u>Activity</u> Misc Government Accounts	Contract Method/Type or Funding <u>Vehicle</u> MIPR	Award or Obligation <u>Date</u> Various	Performing Activity <u>EAC</u> 11,119	Project Office EAC 11,119	Total Prior to FY 1999 7,603	FY 1999 548	FY 2000 527	FY 2001 1,273	Budget to Complete 0	Total Program 9,951
Support and Management Organizations	agement Organiz	zations								
PMO LW 155,	MIPR	Oct 1996	15,867	15,867	7,620	2,070	3,035	2,000	0	14,725
Picatinny, NJ Support Contracts Test and Evaluation Organizations	Contracts on Organizations	Various			2,042	344	308			2,684
Yuma Proving Ground, Yuma	MIPR	Feb 1996	1,900	1,900	1,900	0	0	0	. 0	1.900
AZ (Shoot-off) Yuma Proving	MIPR	Oct 1996	12,929	12,929	1,672	1,288	3,381	1,500	0	7,841
Ground, Yuma AZ. Misc Government	MIPR	Various	3,376	3,376	3,376	30	80	1,138	0	4,624
T&E Contracts	Contracts	Various			0	425	0	0	0	425
Government Furnished Property Contract Method/Type Item or Funding Description Vehicle Product Development Property Benet Labs, MIPR Watervliet Arsenal, NY Support and Management Property	ished Property Contract Method/Type or Funding Vehicle nent Property MIPR agement Propert	Award or Obligation <u>Date</u> Various	Delivery <u>Date</u> Various	c ⁱ	Total Prior to FY 1999 6,726	FY 1999 5,678	FY 2000 1,444	FY 2001 400	Budget to Total Complete Program 0 13,248	Total <u>Program</u> 13,248

(Exhibit R-3, Page 11 of 28)

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST BR	EAKDO	WN (R-3	(1	DATE Fe	February 2000	
вирсет Астипт 4 - Demonstration/Validation	PE NUMBER AND TITLE 0603635M Mari Combat/Suppor	AND TITLE M Marine Supportir	PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	round Systems		PROJECT C2112	
Test and Evaluation Property							
	Total Prior to	FV 1000	FY 2000	FV 2001	Budget to	Total Program	
Subtotal Product Development Subtotal Support and Management Subtotal Total Embreion	54,024	27,616 2,404	20,313 3,343	8,481 2,000	0	110,434 17,409	
Subtrict Total Project	70,634	1,743 31,763	27,117	2,036 13,119	0	142,633	
							-
	R-1 Line Item 58			<u> </u>	Budget Item Justification	ıstification	
				1 <u>/</u> /	/Evhihit D 3 Dags 10 of 28)	0 42 of 201	1

(Exhibit R-3, Page 12 of 28)

RDT&E BUDGET ITEM JUS	JUSTIFICATION SHEET (R-2 Exhibit)	ION SI	HEET (R	-2 Exhil	bit)		DATE Fel	February 2000	00
вирсет АстіуітУ 4 - Demonstration/Validation		PE N 060 Co	PENUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	n⊤∟E Marine Cc porting ⊿	orps Gro	und stems		<u>ا</u>	РРОЈЕСТ С2113
COST (In Millions)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2113 Predator Short Range Assault Weapon	14727	10681	492	0	0	0	0	0	143312
Quantity of RDT&E Articles	51	103							
 A. (U) Mission Description and Budget Hem Justification: (U) Predator (SRAW) will provide the Marine Corps with a lethal, disposable, fire and forget, top-attack, soft launch for firing from enclosed spaces, proliferable, accurate, night vision capable, lightweight, main battle tank killer. Modularity of the system will allow development of optimal warheads (flame, bunker-busting, multi-purpose) to fit the flight module. (U) FX 1999 Accomplishments: (U) S 11,591 Conducted Modeling & Simulation Independent Validation and Verification. (U) S 181 Provided Poperational Testing. (U) S 183 Provided PM/In-House Support/Engineering Change Proposals (ECP) (U) FX 2000 Planned Program: (U) S 14,771 Conduct Operational Testing. (U) S 13.791 Complete Modeling & Simulation (U) S 13.701 Complete Modeling & Simulation (U) S 13.702 Complete Modeling & Simulation (U) S 13.703 PMIn-House Support/ECPs (U) S 13.704 Edminenting/Technical Services Support (U) FY 2001 Planned Program: (U) FY 2001 Planned Program: 	hal, disposabl llarity of the s larity of the	e, fire and fystem will a validation plete Devel ange Propo	forget, top-att allow develo and Verifica topmental Te sals (ECP)	ack, soft lau pment of opt tion.	nch for firin imal warhea	g from encle ids (flame, b	unker-bustin	proliferable,	accurate,
		R-1 Line	R-1 Line Item 58			Bnd	Budget Item Justification	stification	

(Exhibit R-2, Page 13 of 28)

RDT&E BUDGET ITEM JUST	LIFICATI	ON SHEE	USTIFICATION SHEET (R-2 Exhibit)	libit)		рате Feb i	February 2000
виреет Астинт 4 - Demonstration/Validation		PE NUMBER AND TITLE 0603635M Mari Combat/Suppor	PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	Sorps Grou	und stems		PROJECT C2113
• (U) \$ 171 PM/In-House Support • (U) \$ 321 Engineering/Technical Services Support (U)Total \$ 492	oort						
B. (U) <u>Project Change Summary</u>	FY 1999	FY 2000	FY 2001				
(U) Previous President's Budget(U) Adjustments to Previous President's Budget(U) Current Budget Submit	12,781 1,946 14,727	13,371 -2,690 10,681	492 0 492				
(U) Change Summary Explanation:(U) Funding: FY 1999: increase of \$1946K due to reprioritization of programs within the Marine Corps. FY2000: decrease of \$2690K due to reprioritization of programs within the Marine Corps and a minor affordability adjustment.	ioritization of lity adjustmen	programs withi t.	n the Marine Co	rps. FY2000: о	decrease of \$	32690K due to	reprioritization of
(U) Schedule: N/A							
(U) Technical: N/A							
C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN) (U) PMC, 308900, Predator (SRAW)	FY 2000	FY 2001 FY 43,355 47	FY 2002 FY 2003 42,480 48,809	3 FY 2004 9 64,357	FY 2005 62,621	To Compl 331,016	Total <u>Cost</u> 592,638
(U) Related RDT&E: Not Applicable.							
		R-1 Line Item 58	∞		Bud	Budget Item Justification	ification

(Exhibit R-2, Page 14 of 28)

RDT&E BUDGET ITE	M JUSTIFIC,	RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE Feb	February 2000	00
вирдет АстіvітУ 4 - Demonstration/Validation		PENUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	Ground Systems		40	Р R ОЈЕСТ C2113
D. (U) <u>Schedule Profile</u>						
		PREDATOR				
ا د د د	Start	1997 1998 1999 2000 20 1 2 3 4 1 2 3 4 1 2	3 4 1 2 3 4 1	2003 2004	3 4 1 2 3	4
Name Milestone II Approval	6/4/94					
Engineering and Manufacturing	6/4/94					
Design Phase Contract	6/4/94					
Prefim inary Design Review	9/13/94					
(PDK) Fab & Test Engineering	4/13/95					
Critical Design Review	10/21/96					
(CDK) Fab Tech Eval	7 /8 /9 6					
n ard ware Development Testing	11/11/96					
L R Of IOT&E Hardware	7 /2 8 /9 9					
Initial Operational T&E	1/6/00		1844			
MS III Approval	9/2/00					
Production, Fielding/Deployment &	11/22/00					П
Operation outpoil Production Contract	11/22/00					
Initial Operational Capability	3/12/03					
Full Operational Capability (Est.)	6/25/08					1
		R-1 Line Item 58	Bud	Budget Item Justification	tification	

(Exhibit R-2, Page 15 of 28)

RDT&E BUDGET ITEM JUS	JUSTIFICATION SHEET (R-2 Exhibit)	TION SI	JEET (R	-2 Exhil	bit)		DATE FeI	February 2000	00
BUDGET ACTIVITY 4 - Demonstration/Validation	:	PE NI 000 Col	PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	⊓⊓∟E Marine Cc porting ⊿	orps Gro	und stems		a O	РRОЈЕСТ C2256
COST (In Millions)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2256 Integrated Infantry Combat System (IICS)	309	747	909	1749	1766	1782		1795 Continuing Continuing	Continuing
Quantity of RDT&E Articles									

combat Marines. The program will enhance the Marine's battlefield capabilities through the development and integration of an assortment of Marine systems/components Initial funding in this line will be utilized to determine and exploit integration opportunities on existing infantry equipment which will be fielded in the near future. Funds communications and target acquisition technologies. This will provide the infantryman with increased lethality, survivability and situational awareness enhancements. will also be utilized for the Research & Development of a future integrated system which is modular in design which will enhance the infantrymans mobility, lethality, A. (U) Mission Description and Budget Item Justification: (U) USMC name for this program is now Integrated Infantry Combat System (IICS) for dismounted and technologies into a cohesive, timely and combat effective system. These systems/components include weapon, integrated helmet assembly, protective clothing, survivability and communications.

(U) FY 1999 Accomplishments:

86 Program Support and Acquisition Strategy Development \$ (D) (E)

Studies, analysis and support services. 223

(U)Total\$

(U) FY 2000 Planned Program:

Forward Financed

Program Support and Strategy Development

Develop Modeling, Simulation, and Analysis Decision Support System.

Studies and analysis. 130 160 300 747

(U) FY 2001 Planned Program:

423 Integration of existing infantry equipment as determined and recommended by previous studies. • (C) **\$**

R-1 Line Item 58

(Exhibit R-2, Page 16 of 28)

Budget Item Justification

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	N SHEET (F	8-2 Exhibit)	DATE February 2000
вирдет Астіvity 4 - Demonstration/Validation	PE NUMBER AND TITLE 0603635M Mari Combat/Suppor	PENUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	PROJECT C2256
 (U) \$ 0 Integration of existing infantry equipment as determined and recommended by FY 00 funding. (U) \$ 110 Continued development and coordination w/US Army Land Warrior Program. (U) \$ 72 Studies, analysis and support services. (U) Total \$ 605 	ned and recommer y Land Warrior Pr	equipment as determined and recommended by previous studies. This effort forward financed with \$157K of ordination w/US Army Land Warrior Program.	forward financed with \$157K of
B. (U) <u>Project Change Summary</u>	FY 2000	FY 2001	
 (U) Previous President's Budget (U) Adjustments to Previous President's Budget (U) Current Budget Submit 	751 4 747	768 -163 605	
 (U) Change Summary Explanation: (U) Funding: FY 1999: Decrease in the amount of \$421K was due to reprioritization FY 2000: Decrease in the amount of \$4K was due to general reduction FY 2001: Decrease in the amount of \$163K was due to reprioritization (U) Schedule: N/A 	eprioritization of r ıeral reduction. eprioritization of r	of \$421K was due to reprioritization of requirements within the Marine Corps. of \$4K was due to general reduction. of \$163K was due to reprioritization of requirements within the Marine Corps and PBD 604 Reduction.	and PBD 604 Reduction.
(U) Technical: N/A			
 (U) Related RDT&E: (U) PE 0602131M (Marine Corps Landing Force Technology) (U) PE 0603640M (Marine Corps Advanced Technology Demonstration) (U) PE 64657M (US Army Land Warrior Program) 	a		
R-	R-1 Line Item 58	Bud	Budget Item Justification
		(Exhib	(Exhibit R-2, Page 17 of 28)

PROJECT C2256 February 2000 Qtr 4 Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 (Exhibit R-2, Page 18 of 28) Budget Item Justification DATE PENUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) 2000 INTEGRATED INFANTRY COMBAT SYSTEM R-1 Line Item 58 1998 4 - Demonstration/Validation Raytheon Market Survey Develop MS&A capability A. D. Little Fightability St C. (U) Schedule Profile: Systems Integration KPP Development Integration R&D Baseline Study Milestone 0 Task Name Milestone I **BUDGET ACTIVITY** Phase 0 7 9 ₽ 9 ω တ က 2

RDT&E BUDGET ITEM JUS	USTIFICATION SHEET (R-2 Exhibit)	TION SI	HEET (R	R-2 Exhil	bit)		DATE Fel	February 2000	000
BUDGET ACTIVITY 4 - Demonstration/Validation		PE NI 060 Col	PE NUMBER AND TITLE 0603635M Mari Combat/Suppor	PENUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	orps Gro	und stems		a O	РРОЈЕСТ С2507
COST (In Millions)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2507 Small Unit Riverine Craft (SURC)	0	3021	1757	225	10	0	0	0	5003
Quantity of RDT&E Articles									

A. (U) Mission Description and Budget Item Justification:

(U) The Small Unit Riverine Craft (SURC) will provide tactical mobility and a weapons platform for elements of a Marine Air Ground Task Force (MAGTF) Ground Combat Element (GCE) in the Riverine Environment. The SURC will replace the Rigid Raiding Craft (RRC) which was fielded 12 years ago. It will augment the larger Riverine Assault Craft (RAC) in riverine operations to include troop transport, troop insertion, and extraction, convoy ops, and application of fires.

(U) FY 1999 Accomplishments: Not Applicable.

(U) FY 2000 Planned Program:

(U) Total \$	368 Syste 325 Deve 150 Com 625 Proct 1,483 Proct 70 Provi 3,021	System Analysis for SURC integration and testing of non-developmental components. Developmental Test Plan/Conduct Developmental Testing / Performance and Functioning testing. Commercial Design Review for non-developmental integration. Commercial Design Review for non-developmental integration. Procure Candidate Hulls and conduct modifications for the integration of non-developmental candidate sub-systems. Procure and Integrate candidate Engines, Propulsion System, Navigation and Communication System, and Weapon System Mounts into Hulls. Provide Government Project Management and Documentation Support for the SURC Program.
$\sim \sim \sim \sim \sim \sim \omega$		368 325 150 625 1,483 70 70

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Budget Item Justification

R-1 Line Item 58

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	ON SHEET (R-2 Exhit	oit)		DATE Febr	February 2000
вирбет Астіуіту 4 - Demonstration/Validation	PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	गार∟ Marine Co pporting A	rps Grou Arms Sys	ind tems		PROJECT C2507
 (U) FY 2001 Planned Program: (U) \$ 564 Continue Integration and Testing of NDI System Components / Performance & Functioning Testing. (U) \$ 800 Fabrication of OT Prototype Craft / Fabrication of Gun Mount. (U) \$ 300 Continue System Analysis / finalize Prototype Development and Commercial Design / and Developmental Testing Plan. (U) \$ 93 Continue Government Project Management Office support for the SURC Program. (U) Total \$ 1,757 	mponents / Perforr Jun Mount. slopment and Comr support for the SUR	nance & Funct nercial Design C Program.	ioning Testi / and Develo	ng. opmental Tes	ting Plan.	
B. (U) Project Change Summary	FY 2000	FY 2001				
(U) Previous President's Budget (U) Adjustments to Previous President's Budget (U) Current Budget Submit	3038 -17 3021	1750 +7 1757				
(U) Change Summary Explanation:(U) Funding: FY 00 decrease of \$17K due to a minor affordability adjustment. FY 01 increase of \$7K is due to NWCF rate changes and NAVCOMPT adjustments.	stment. FY 01 inc	rease of \$7K i	s due to NW	CF rate chan	ges and NAV	COMPT
(U) Schedule: Milestone-I date was changed to 2d Qtr FY 00 due to staffing of program documentation.	ffing of program do	cumentation.				
(U) Technical: N/A						
C. (U) Other Program Funding Summary FY 1999 FY 2000 E (APPN, BLI #, NOMEN)	FY 2001 FY 2002	FY 2003	FY 2004	FY 2005	To	Total Cost
(U) PMC BLI # 667000, SURC 0 0	0 2156	3233	3207	0	0	7686
(U) Related RDT&E: Not Applicable.						
•				Ċ	: :	: : : :
	K-1 Line Item 58			Bnage	Budget Item Justification	rication

(Exhibit R-2, Page 20 of 28)

	RDT&E BUDGET ITEM	T ITE	•	JSTIF	ICA:	TION	SHEE	r (R	JUSTIFICATION SHEET (R-2 Exhibit)	<u> </u>	ŝ	DATE Fe	February 2000	00
8UDG 4 - 1	вирсет Астииту 4 - Demonstration/Validation					<u> </u>	PE NUMBER AND TITLE 0603635M Marin Combat/Suppor	AND TI	PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	s Gro ns Sy	und stems		4 O	PROJECT C2507
D.	(U) <u>Schedule Profile</u>													
	SMALL UNIT RIVE!	UNIT R	IVERI	RINE CRAFT (SURC)	AFT (S	URC								
_	Tack Name	2000 Ofr 1	Ofr 2 O	Otr 3 Otr 4		2001 Otr 1 Otr 2 Otr 3	Ofr 3 Ofr 4	2002 4 Ofr 1	Otr 2 Otr 3	Ofr 4	2003 Otr 1 Otr 2	Otr 2 Otr 3 Otr 4		
-	Milestone I													
2	Release RFP	,	•											
က	Contractor Proposal Dev.	,	↓							•				
4	Source Selection Board			*										-
2	Contract Award			•										
9	Fabricate Prototypes			Ţ										
_	Developmental Testing													
80	Milestone II						*					-		
6	Fabricate EMD Craft	· · · ·						Į						
우	Operational Testing								•					
F	Milestone III	,									_			
12	Contract Award										_			
13	FOC													
		,						-						
		·····										·		
]						R-1 I	R-1 Line Item 58	. 8			B	Budget Item Justification	stification	
											(Ext	(Exhibit R-2, Page 21 of 28)	e 21 of 28)	

(Exhibit R-2, Page 21 of 28)

UNCLASSIFIED

Marine Corps Ground Supporting Arms Systems Supporting Arms Systems	RDT&E PROGRAM ELEMENT/PROJEC	IT/PROJECT COST BREAKDOWN (R-3)	REAKDO	WN (R-	3)	DATE Fe	February 2000
### 1799 EY 2000 EY 2001 ### 1799 EY 2000 ### 1799 ### 1799 EY 2000 ### 1799 ###	BUDGET ACTIVITY 4 - Demonstration/Validation	PE NUMBER 0603635 Combat	AND TITLE IM Marine /Supporti	e Corps G	iround Systems		PROJECT C2507
1757 1757	A. (U) <u>Project Cost Breakdown</u> a. Government Developmental Engineering / Contract	FY	0	$\frac{\text{FY } 2000}{2125}$	FY 2001 300	1	
tet Acquisition History and Planning Information uing Organizations Project or contract Total of contract or contract	development. b. Test and Evaluation. c. Conduct Engineering and Prototype Development. d. Program Management Support Total		0000	325 501 70 3021	609 755 93 1757	7 2 2 2	
ing Organizations not or Contract contract Contract Contract Project Prior to Nethool/Type Award or Performing Obligation Activity Office Prior to Vehicle Date Date Date Date Date Date Date Dat	B. Budget Acquisition History and Planning Information						
Development Organizations 2arderock, WR	Organizations Contract Method/Type Award or Performing or Funding Obligation Activity Vehicle Date EAC	Pr FY	FY 1999	$\overline{ ext{FY} 2000}$	FY 2001	Budget to Complete	Total <u>Program</u>
VA Sarderock, WR Oct 1999 1256 1256 0 0 0 501 755 0 Carderock, WR Oct 1999 1256 1256 0 0 0 501 755 0 Carderock, WR Oct 1999 173 173 0 0 0 70 93 10 Cardinations WR Oct 1999 934 934 0 0 325 609 0 Cardination Cardinations WR Oct 1999 934 934 0 0 0 Cardination C	Oct 1999 2650		0	2125	300	225	2650
### and Management Organizations ### triangle MIPR Oct 1999	WR Oct 1999 1256		0	501	755	0	1256
i Evaluation Organizations WR Oct 1999 934 934 0 0 325 609 ck, Suffolk	nagement Organizations MIPR Oct 1999 173		0	70	93	10	173
	I Evaluation Organizations WR Oct 1999 934 ck, Suffolk		0	325	609	0	934
		R-1 Line Item 58	8		Bu	Budget Item Justification	stification

(Exhibit R-3, Page 22 of 28)

RDT&E PROGRAM ELEMENT	T/PROJECT COST BREAKDOWN (R-3)	EAKDOWN (R	(-3)	DATE Fe	February 2000
вирсет астіvity 4 - Demonstration/Validation	PE NUMBER AND TITLE 0603635M Mari Combat/Suppor	PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	Ground s Systems		PROJECT C2507
Government Furnished Property N/A Contract Method/Type Award or Item or Funding Obligation Delivery Description Vehicle Date Product Development Property	Total Prior to FY 1999	FY 1999 FY 2000	<u>FY 2001</u>	Budget to Complete	Total <u>Program</u>
Support and Management Property					
Test and Evaluation Property					
Subtotal Product Development Subtotal Support and Management Subtotal Test and Evaluation Total Project	Total Prior to FY 1999 0 0 0 0	FY 1999 FY 2000 0 2626 0 70 0 325 0 3021	FY 2001 1055 93 609 1757	Budget to Complete 225 10 0 235	Total Program 3906 173 934 5013
	R-1 Line Item 58		ă	Budget Item Justification	stification
			1,47)	7. T. T. T. C. C. C. C. C. C. C. C. C. C. C. C. C.	100 3- 00

(Exhibit R-3, Page 23 of 28)

RDT&E BUDGET ITEM JUS	STIFICA	TION S	JUSTIFICATION SHEET (R-2 Exhibit)	-2 Exhi	bit)		DATE Fel	February 2000	00
BUDGET ACTIVITY 4 - Demonstration/Validation		PE NI 060 Col	PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	ππ∟Ε Marine Cα pporting ⊿	orps Grou Arms Sys	und stems		40	РРОЈЕСТ C2508
COST (In Millions)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2508 Internally Transportable Vehicle	0	5196	9830	6073	4875	241	240	130	23385
Quantity of RDT&E Articles		2							
A. (U) Mission Description and Budget Item Justification: The Internally Transportable Vehicles (ITV) program was previously known as the Light Strike Vehicle (LSV) program. This project develops a joint MV-22 aircraft transportable family of light tactical, wheeled vehicles. The ITV's will provide reconnaisance units with a high mobility weapons platform. Follow-on variants will address logistics, command and control, medical and personnel movement missions. The ITV will replace the Fast Attack Vehicles (FAVs) currently employed throughout the Marine Air Ground Task Force (MAGTF).	The Internall ransportable is logistics, co	y Transports family of lig ommand anc Ground Tasl	able Vehicles ght tactical, v d control, me k Force (MA	s (ITV) prog wheeled vehi dical and pe GTF).	ram was prev cles. The IT rsonnel mov	/iously knov V's will pro ement missi	vn as the Lig vide reconna ons. The I	the Light Strike Vehicle reconnaisance units with a The ITV will replace the	hicle with a see the
(U) FY 1999 Accomplishments: Not Applicable.									·
 (U) FY 2000 Planned Program: (U) \$ 4200 Begin Demonstration and Validation of two contract design vehicles. (U) \$ 100 Provide In House program management and TAD/travel. (U) \$ 646 Provide Engineering Support. (U) \$ 250 Prepare for automotive test rig testing. (U)Total \$ 5196 	on of two cor ment and TA ing.	tract design D/travel.	vehicles.						
 (U) FY 2001 Planned Program: (U) \$ 5399 Complete Demonstration and Validaton and begin Engin (U) \$ 168 Provide In House program management and TAD/travel. (U) \$ 613 Provide Engineering Support. (U) \$ 450 Begin Automotive Test Rig testing (U) Total \$ 6630 	daton and beg iment and TA	gin Engineei .D/travel.	Validaton and begin Engineering, Manufacturing , and Development. inagement and TAD/travel. sting	cturing, and	. Developme	nt.			
		R-1 Line	R-1 Line Item 58			Bud	Budget Item Justification	stification	
						!	1		

(Exhibit R-2, Page 24 of 28)

RDT&E BUDGET ITEM JUSTIFICA	TION SHEE	USTIFICATION SHEET (R-2 Exhibit)	oit)	a	DATE February 2000	000
BUDGET ACTIVITY 4 - Demonstration/Validation	PE NUMBER 060363. Comba	PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	rps Grou Arms Syst	nd tems		РВОЈЕСТ C2508
B. (U) <u>Project Change Summary</u>	99 FY 2000	FY 2001				
(U) Previous President's Budget(U) Adjustments to Previous President's Budget(U) Current Budget Submit	0 1624 0 3572 0 5196	1973 4657 6630				
(U) Change Summary Explanation:						
(U) Funding: FY00 and FY01 increase provides for the award of	two competitive c	for the award of two competitive contractor designs through DEM/VAL and EMD.	rough DEM/	VAL and EM	D	
(U) Schedule: N/A						
(U) Technical: N/A						
C. (U) Other Program Funding Summary (APPN, BLI #, NOMEN) (U) PMC BLI# 204000 Light Strike Vehicle 0 0	FY 2001	FY 2002 FY 2003	FY 2004 15870	<u>FY 2005</u> 29039	To Compl Cont.	Total Cost Cont.
(U) Related RDT&E: SOCCOM joint participation in ITV program						
	R-1 Line Item 58	28		Budge	Budget Item Justification	
				C C 4:4:4:4	(00 J- 30 0 C C	_

(Exhibit R-2, Page 25 of 28)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

PE NUMBER AND TITLE
0603635M Marine Corps Ground
Combat/Supporting Arms Systems

PROJECT C2508

February 2000

DATE

D. (U) Schedule Profile

4 - Demonstration/Validation

BUDGET ACTIVITY



Internally Transportable Vehicle

Fiscal Year	9.6	0 0	0.1	0.2	03	0.4	0.5
Milestones	\Diamond	- Sept 99	Oll - Jan 01	1	\Diamond	- Jul 03	
PDRR Award		N ay 00	00 A				
PDR		7	Sept 00				
ATR Delivery / Testing		7	****	Sep 00 - Jan 01			
EMD Option Award			\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	0.1			
CDR			N ay 01				
TRR				4	Apr 02		
D T - 11					A P.	Apr 02 - Mar 03	
Refurbish					☐ Dec 02- Jan 03	Jan 03	
IOT&E						Feb 03 - Apr 03	
LFT&E					Ē	Mar 03 - Apr 03	
Production Award							
Full Rate Production				0 0 0 0	Oct 03 - Sep 05		
						55 55 50	096

R-1 Line Item 58

Budget Item Justification

(Exhibit R-2, Page 26 of 28)

RDT	RE PROG	SRAM EL	RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	OJECT	OST BI	REAKDC	WN (R-3	3)	DATE Fe	February 2000
вирсет астіvіту 4 - Demonstration/Validation	tion/Validat	ion			PE NUMBER AND TITLE 0603635M Mari Combat/Suppor	AND TITLE IM Marine /Supporti	PE NUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	round Systems		PROJECT C2508
A. (U) <u>Project Cost Breakdown</u> Production Development Support and Management Test and Evaluation	t Breakdown ment ment			FY 1999 0 0	FY	FY 2000 4200 746 250	FY 2001 5399 781 450			
Total				0		5196	9630			·
B. Budget Acquisition History and Planning Information Performing Organizations	tion History and izations	d Planning In	<u>formation</u>							
Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation <u>Date</u>	Performing Activity EAC	Project Office <u>EAC</u>	Total Prior to FY 1999	FY 1999	FY 2000	FY 2001	Budget to Complete	Total <u>Program</u>
Product Development Organizations MCSC RCP	ent Organizatic RCP	suc			0	0	4200	5399	5950	15549
Support and Management Organizations NSWC, Carderock	gement Organi	izations			0	0	346	200	200	1046
WES Army Eng	MIPR				00	00	75	00	00	75 75
MCSC	WR				00	0	100	168	232	500
MCSC (PM) Test and Evaluation Organizations	RCP				0	0	150	413	779	
APG, TEST CTR NATC, PAX	MIPR RCP				0 0	0 0	50 200	250	350	4150 800
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				R-1	R-1 Line Item 58	8		ğ	Budget Item Justification	stification
								L,		100

(Exhibit R-3, Page 27 of 28)

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	COST BF	REAKDO	WN (R-3	()	DATE Fe	February 2000
вирдет Астилтү 4 - Demonstration/Validation	PE NUMBER AND TITLE 0603635M Mari Combat/Suppor	AND TITLE IM Marine /Supporti	PENUMBER AND TITLE 0603635M Marine Corps Ground Combat/Supporting Arms Systems	round		PROJECT C2508
Government Furnished Property: Not applicable Contract Method/Type Award or Item or Funding Obligation Delivery Description Vehicle Date Product Development Property	Total Prior to FY 1999	FY 1999	FY 2000	FY 2001	Budget to Complete	Total <u>Program</u>
Support and Management Property						
Test and Evaluation Property						
Subtotal Product Development Subtotal Support and Management	Total Prior to FY 1999	FY 1999	FY 2000 4200 996	FY 2001 5399 1231	Budget to Complete 5950 5609	Total <u>Program</u> 15549 7836
Subtotal Test and Evaluation Total Project			5196	6630	11559	23385
	R-1 Line Item 58	∞		ă	Budget Item Justification	ıstification
				(EV	(Evhihit B.3 Page 28 of 28)	19 28 of 28)

(Exhibit R-3, Page 28 of 28)

UNCLASSIFIED

EXHIBIT R-2, R	EXHIBIT R-2, RDT&E Budget Item Justification	Justification				DATE:	Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE	AENCLATURE				,
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	I, NAVY/BA-4			Joint Service E	Joint Service EOD Development/0603654N	ent/0603654N			
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete	Total Cost
Total PE Cost	10.381	11.107	13.131	12.876	13.115	12.422	11.766	Continuing	Cont.
Joint Service EOD Systems/Q0377	5.083	6.040	6.053	6.046	6.144	6.279	6.425	Continuing	Cont.
EOD Diving System/Q1317	5.298	5.067	7.078	6.830	6.971	6.143	5.341	Continuing	Cont.
Quantity of RDT&E Articles	Various	Various	Various	Various	Various	Various	Various		

for management of the Joint Service Explosive Ordnance Disposal Research and Development Program. Increasing types of foreign and domestic weapons necessitate a continuing development program to provide Explosive Ordnance Disposal personnel of all military services with the special equipment and tools required to support this mission. This program also provides life support related equipment necessary to support the performance of Navy Explosive Ordnance Disposal tasks underwater. This equipment must have inherently low acoustic and magnetic signatures in order to allow the Explosive Ordnance Disposal technician to safely approach, render-safe and A. Mission Description and Budget Item Justification: This is a Joint Service Program. This program provides for the development of Explosive Ordnance Disposal tools and equipment for use by all military services. The responsibility is assigned to the Navy as single service manager, by Department of Defense Directive 5160.62 of 26 April 1989, dispose of sea mines and other underwater ordnance.

Note: In accordance with 15 USC 638, \$.227M in FY 2000 is reserved for the Small Business Innovative Research (SBIR) assessment.

	FY 1999	FY 2000	FY 2001	
FY 2000 President's Budget:	10.756	11.168	10.882	
Appropriated Value:	10.756	11.168		
Adjustment to FY 1999 Appropriated Value/2000 President's Budget				
a. General Adjustments	-0.375	-0.061	-0.300	
b. MCM Unmanned Underwater Vehicle project			2.600	
c. A-76 Adjustment			-0.051	
FY 2001 President's Budget:	10.381	11.107	13.131	

Funding: FY 99/FY00 decreases are due to general adjustments. FY01 increase is due to the MCM Unmanned Underwater Vehicle project.

FY01 includes decrease due to Strategic Sourcing Program study adjustment and general adjustments.

Schedule: Not applicable for Q0377. Q1317-The Acoustic Firing System (AFS) Acquisition Program Baseline has been revised to include the transistion to a new Design Agent. Subsequently the schedule has been updated and reflected in this submit.

Technical: Not applicable.

R-1 SHOPPING LIST - Item No.

23

(Exhibit R-2, page 1 of 15) Exhibit R-2, RDT&E Budget Item Justification

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	ification				DATE:	Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4	PROGRAM ELEME JT Service EOD		NT NAME AND NUMBER Development/0603654N	ER 3654N	PROJECT NAME AND NUMBER JT Service EOD Systems/Q0377	ME AND NUMI D Systems/Q0	377			
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		5.083	6.040	6.053	6.046	6.144	6.279	6.425	Continuing	Cont.
RDT&E Articles Qty		Various	Various	Various	Various	Various	Various	Various		

support their mission of detection/location, identification, render-safe, recovery, field and laboratory evaluation, and disposal of unexploded ordnance (UXO) that is a threat to A. Mission Description and Budget Item Justification: Provides Explosive Ordnance personnel of all military services with the specialized equipment and tools required to military operations, installations, personnel, or material. UXO includes foriegn and domestic, both conventional and non-conventional, including improvised explosive devices

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1999 ACCOMPLISHMENTS:

(\$1.924) Obtained Milestone III decision for Remote Ordnance Neutralization System (RONS) and Main Charge Disrupter (MCD) projects.
(\$2.038) Continued development of the Classified Project II and Lightweight Disposable Disrupter (LIDD) projects.
(\$1.121) Conducted Analysis of Alternatives studies of the Explosive Safe/Arm Monitor, and Large Improvised Explosive Device (IED) Neutralization projects. Initiated the Improved (Standoff) Disrupter Tools (Small Caliber Dearmer and Standoff Disrupter) projects.

2. FY2000 PLAN:

(\$.900) Obtain Milestone III decision for LIDD project.

(\$3.240) Continue development of the Classified Project II, Small Caliber Dearmer (SCD) and Standoff Disrupter (SD) projects. (\$1.500) Initiate the Large IED Neutralization project. (\$.400) Conduct Analysis of Alternative studies for the Explosive Safe/Arm (ESA) Monitor and EOD Incident C2I System projects.

3. FY2001 PLAN:

(1.900) Obtain approval for full rate production for Small Caliber Dearmer project and the Standoff Disrupter UXO and Standoff Disrupter IED projects.

(3.653) Continue development of Large IED Neutralization, Classified Project II and initiate the EOD Incident C2I System project.

(.500) Conduct Analysis of Alternatives studies in the areas of Submunitions Clearance and Hand Held Ordnance Locator.

R-1 SHOPPING LIST - Item No.

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 2 of 15)

UNCLASSIFIED

ЕХНІВІТ	EXHIBIT R-2a, RDT&E Project Justification	stification			٥	DATE:	February 2000	y 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	ME AND NUMBER		PROJECT NAME AND NUMBER	E AND NUMBE	H.			Г
RDT&E, N/BA-4	JT Service EOD Development 0603654N	lopment 06036		JT Service EOD Systems/Q0377	Systems/Q037	7			η
B. Other Program Funding Summary:									
	FY 1999 FY 2000	0 FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost	
OPN Line Item 5509	3.044 1.568	8 0.614	0.934	0.960	1.290	1.200	CONT.	CONT.	
3400	0.234						0.000	0.797	
C. Acquisition Strategy: Analysis of Alternatives (AOA) studies are always conducted prior to the initiation of new subprojects. The AOA addresses and emphasizes	ives (AOA) studies are	always conduct	ed prior to t	the initiation	of new sub	projects. The	ne AOA addre	esses and emphasize	

acquisition strategies of the most cost-effective solution over the subprojects' life-cycle. The acquisition strategies observe the following hierarchy of alternatives: commercial item (including modification), and lastly, developmental programs. Contracting for RDT&E, if required, is always competitive and when feasible, production options are included.

D. Schedule Profile: See Attached.

R-1 SHOPPING LIST - Item No. 59

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 3 of 15)

UNCLASSIFIED

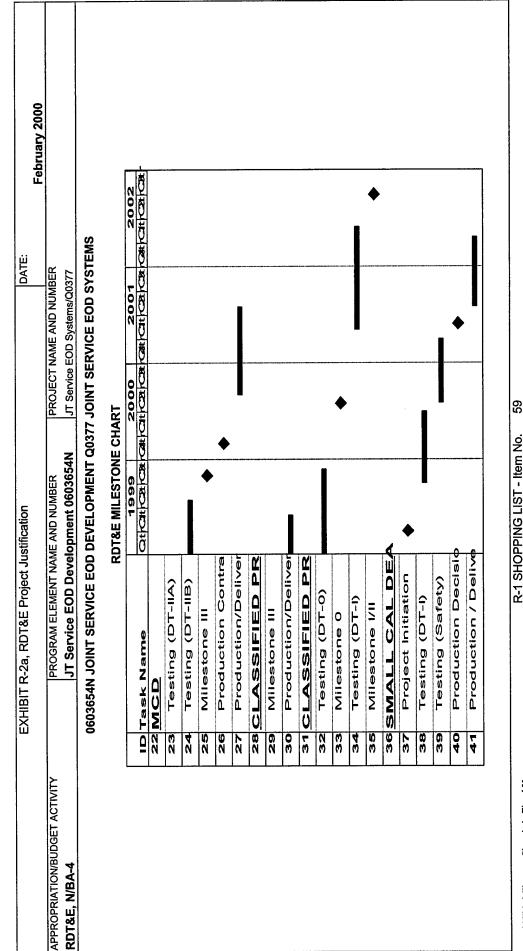
		EXHIBIT R-2a, RDT&E Project Justification	Justification		DATE: Februa	February 2000
APPROPRIATION/BUDGET ACTIVITY DDT&E N/RA-4		PROGRAM ELEMENT NAME AND NUMBER	NT NAME AND NUMBER Development 0603654N	PROJECT NAME AND NUMBER IT Service FOD Systems/O0377		
		0603654N JOINT SERVICE EOD DEVELOPMENT Q0377 JOINT SERVICE EOD SYSTEMS	OD DEVELOPMENT Q03	77 JOINT SERVICE EOD (YSTEMS	
			RDT&E MILESTONE CHART	HART		
	Ė		1999	1999 2000 2001 2002	2007 2007 2007	
	5 -	1 RONS				
	N	Testing (DT-IIA)				
	6	Testing (DT- IIB)				
	4	Testing (DT-IIC)	Î	a tu man ma		
	10	Milestone III	•			
	9	Production Option	•			
1	^	Production/Deliver				
1	8	ARS	***************************************	******	·	
1	6	Testing (DT-IIB)				
	10	Milestone III		1		
	7	Production Option	•	***************************************		
	7	Production/Deliver				
	13					
	4	Testing (DT-IB)		- ON MANUAL INC.		
	15	Milestone II		***************************************		
	16	Testing (DT-IIA)	1			
	17	Testing (DT-IIB/OT		·=-		
1	18	Testing (OPEVAL)				
L	19	Milestone III		•		
1	20	Production Contra		•		
	2	Production/Deliver				
				32		

**This Milestone Chart is in Fiscal Years

R-1 SHOPPING LIST - Item No. 59

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 4 of 15)

UNCLASSIFIED

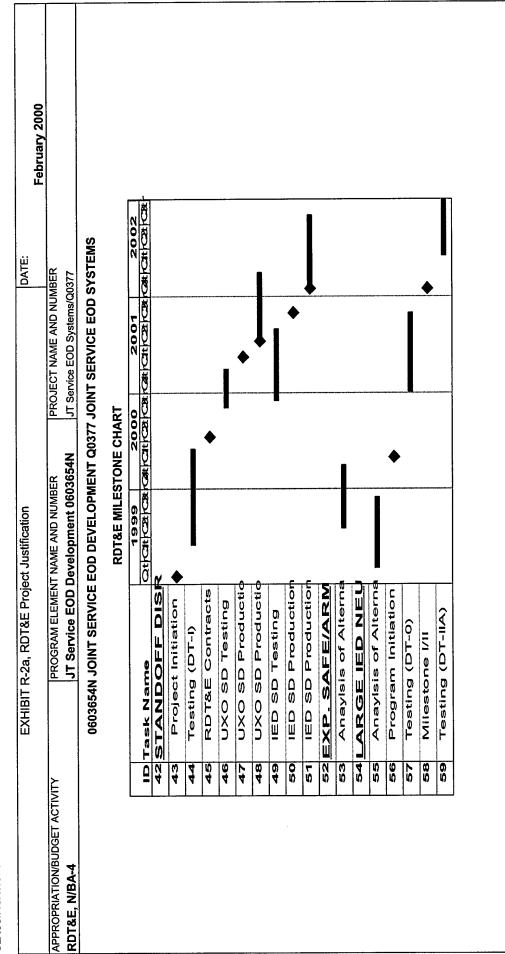


R-1 SHOPPING LIST - Item No.

**This Milestone Chart is in Fiscal Years

(Exhibit R-2a, page 5 of 15) Exhibit R-2a, RDT&E Project Justification

UNCLASSIFIED



**This Milestone Chart is in Fiscal Years

R-1 SHOPPING LIST - Item No. 59

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 6 of 15)

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	DATE:	February 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4	PROGRAM ELEMENT NAME AND NUMBER JT Service EOD Development 0603654N	PROJECT NAME AND NUMBER JT Service EOD Systems/Q0377	

0603654N JOINT SERVICE EOD DEVELOPMENT Q0377 JOINT SERVICE EOD SYSTEMS

RDT&E MILESTONE CHART

		1999	2000	2001	2002
<u>^</u>	ID Task Name	Other Hospical A	ALCOHOLOGICAL COM	ON CHANCE CONTROL CONT	GH CH CH CH
60	60 EOD INCIDENT	O			
61	Anaylsis of Alterna				
62	Program Initiation			•	
63	Testing (DT-0)				
4	Testing (DT-I)	***************************************			
69	65 HAND HELD OR				
99	Anaylsis of Alterna				
67	Program Initiation	34444 B-10 H			*
89	Testing (DT-0)	B-B-18-2-14			
69	SUBMUNITIONS 69				
10	Anaylsis of Alterna				
7.1	Program Initiation				*
72	Testing (DT-0)				

**This Milestone Chart is in Fiscal Years

R-1 SHOPPING LIST - Item No. 59

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 7 of 15)

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_								_	_		_	_	_		_	_	_		-			_	
				Target Value	of Contract	N/A	N/A	N/A					N/A		A/N	A/A						N/A	
	00			e to L	Cost	Continuing	Continuing	Continuing	0.000	0.000	0.000	0.000	Continuing		3.520	Continuing	0.000	0.000	0.000	0.000	0.000	3.520	
	February 2000	i		2	Complete	Continuing	Continuing	Continuing					Continuing		0.500	0000						0.500	
				FY 01	Date	10/00	10/00	10/00							01/01								
DATE		IBER	Q0377	20 70	Cost	2.085	0.075	0.850					3.010		0.340	0.00						0.340	
		PROJECT NAME AND NUMBER	Joint Service EOD Systems/Q0377	FY 00	Date	10/99		10/99							01/00								
		PROJECT NA	Joint Service	20 /1	Cost	2.493		0.910					3.403		0.340	0.000						0.340	
				FY 99	Award	10/98	10/98	10/98							01/99								
				8	Cost	1.611	0:020	0.820					2.481		0.320	0.000						0.320	
		LEMENT		Total	Cost	69.956	3.254	32.540					105.750		2.020	0000						2.020	
		PROGRAM ELEMENT	0603654N	Performing	Activity & Location	EODTD, IH, MD	EODTD, IH, MD	EODTD, IH, MD							Dynamic Systems Alex VA	TBD							
	ige 1)	VITY		Contract	Method & Type	1		W.R.							C/CPEE	C/CPFF			-				
	Exhibit R-3 Cost Analysis (page 1)	APPROPRIATION/BUDGET ACTIVITY	RDT&E, N/BA-4	Cost Categories	(Tailor to WBS, or System/Item Requirements)	Primary Hardware Development	Software Development	S					Subtotal Product Development	Remarks:	Description Management Support	Program Management Support						Subtotal Support	Remarks:

R-1 SHOPPING LIST - Item No. 59

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 8 of 15)

UNCLASSIFIED

								DATE:				
Exhibit R-3 Cost Analysis (page 2)	te 2)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	LI.	PROGRAM ELEMENT	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	MBER				
RDT&E, N/BA-4		0603654N				Joint Service	Joint Service EOD Systems/Q0377	/Q0377				
ystem/item		Performing Activity &	Total PY s	FY 99	FY 99 Award	FY 00	FY 00 Award	FY 01	FY 01 Award	Cost to	Total	Target Value
	& Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Test & Evaluation		EODTD, IH, MD	48.812	1.296	10/98	1.050	10/99	1.545	10/00	Continuing	Continuing	ΝΑ
	WR	EODTD, IH, MD	8.135			0.110	10/99			Continuing	Continuing	N/A
											0.000	
											0.000	
Subtotal T&E			56.947	1.296		1.160		1.545		Continuing	Continuing	N/A
Remarks:												
Program Management Personnel	WR	EODTD, IH, MD	3.000	0.220	10/98	0.225	10/99	0.225	10/00	Continuing	Continuing	N/A
Miscellaneous	Various	Various	0.800	0.766	02/99	0.912	05/00	0.933	02/01	Continuing	Continuing	N/A
											0.000	
											0.000	
											0.000	
											0.000	
Subtotal Management			3.800	0.986		1.137		1.158		Continuing	Continuing	A/A
Remarks:												-
Total Cost			168.517	5.083		6.040		6.053		0.500	Continuing	N/A
Remarks:												
			2	AN ACTION OF THE PARTY OF THE	Home Ma	C						

R-1 SHOPPING LIST - Item No. 59

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 9 of 15)

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	iffication				DATE:	Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E. N/BA-4	PROGRAM ELEMENT NAME AND NUMBER JT Service EOD Development/0603654N	EMENT NAME EOD Develo	AND NUMBE	54N	PROJECT NAME AND NUN EOD Diving Systems/Q1317	PROJECT NAME AND NUMBER EOD Diving Systems/Q1317	3ER			
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		5.298	5.067	7.078	6.830	6.971	6.143	5.341	Continuing	Cont.
RDT&E Articles Qty		Various	Various	Various	Various	Various	Various	Various		

underwater operations. The equipment must have inherently low acoustic and magnetic signatures in order to allow the EOD technician to safely approach, render-safe, and dispose of sea mines and other underwater ordnance. Provides support for the Navy's high priority mission of Very Shallow Water (VSW) mine countermeasures, including A. Mission Description and Budget Item Justification: Provides for development of diving equipment and explosive charges to support Explosive Ordnance Disposal (EOD) clandestine reconnaissance, in support of amphibious operations. This also includes the development of small, affordable MCM Unmanned Underwater Vehicles. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1999 ACCOMPLISHMENTS:

- (\$.323) Continued to develop equipment which improves diver capability and endurance.
- (\$.400) Continued to develop a non-magnetic acoustic firing system. (\$.777) Continued to develop non-magnetic diver held underwater equipment to detect objects in the water column. (\$.300) Continued to develop non-magnetic diver underwater navigation system compatible with GPS.
- (\$.309) Continued development of low influence underwater diver mounted display which will provide video interface with other EOD systems (Underwater Imaging System, Underwater Navigation System and MK 16 UBA).
 - (\$.385) Continued development of non-magnetic underwater vehicles to transport divers and associated equipment in support of MCM operations.
- (2.804) Continued development, testing and gained approval for fleet use of specialized equipment to support the Very Shallow Water Mine Countermeasures mission and CNO approved VSW MCM Detachment (USN/USMC).

2. FY2000 PLAN:

- (\$.380) Continue developing equipment which improves diver capability and endurance.
 (\$.853) Continue developing a non-magnetic acoustic firing system.
 (\$.904) Continue developing non-magnetic diver held underwater equipment to detect objects in the water column.
 (\$.434) Initiate the development of 1.3 ata HeO2 diving tables for the MK 16 MOD 0 underwater breathing apparatus.

R-1 SHOPPING LIST - Item No.

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 10 of 15)

UNCLASSIFIED

EXHIBI	EXHIBIT R-2a, RDT&E Project Justification	DATE	
			February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	JT Service EOD Development/0603654N	EOD Diving Systems/Q1317	

(\$2.496) Continue to develop, test and gain approval for fleet use of specialized equipment to support the Very Shallow Water Mine Countermeasures mission and CNO approved VSEMCM Detachment (USN/USMC).

FY2001 PLAN:
 (\$.203) Continue developing equipment which improves diver capability and endurance.
 (\$.203) Continue developing a non-magnetic acoustic firing system.
 (\$.920) Continue developing a non-magnetic diver held underwater equipment to detect objects in the water column.
 (\$.709) Continue developing non-magnetic diver held underwater equipment to detect objects in the water column.
 (\$.584) Continue developing 1.3 ata HeO2 diving tables for the MK 16 MOD 0 underwater breathing apparatus.
 (\$.083) Conduct Analysis Of Alternatives for equipment to enhance the divers ability to detect, neutralize and gather intelligence on underwater limpet and special attach

(\$4.579) Continue to develop, test and gain approval for fleet use of specialized equipment to support the Very Shallow Water Mine Countermeasures mission and CNO approved VSW MCM Detachment (USN/USMC). This also includes the development of small, affordable MCM Unmanned Underwater Vehicles.

B. Other Program Funding Summary

Total Cost			2.400	Cont.
To Complete				Cont.
FY 2005				6.194
FY 2004				2.284
FY 2003			1.000	3.487
FY 2002			1.400	5.886
FY 2001				3.305
FY 2000				2.219
FY 1999		4.080		
	OPN Line Item	1140	3400	0975

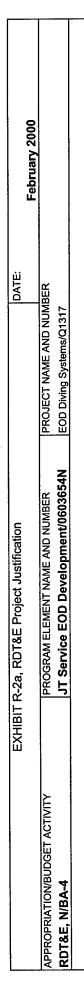
C.Acquisition Strategy: Analysis of Alternatives (AOA) studies are always conducted prior to the initiation of new subprojects. The AOA addresses and emphasizes acquisition strategies of the most cost-effective solution over the subprojects' life-cycle. The acquisition strategies observe the following hierarchy of alternatives: commercial item (including modification), non-developmental item (including modification), and lastly, developmental programs. Contracting for RDT&E, if required, is always competitive and when feasible, production options are included.

D. Schedule Profile: See Attached.

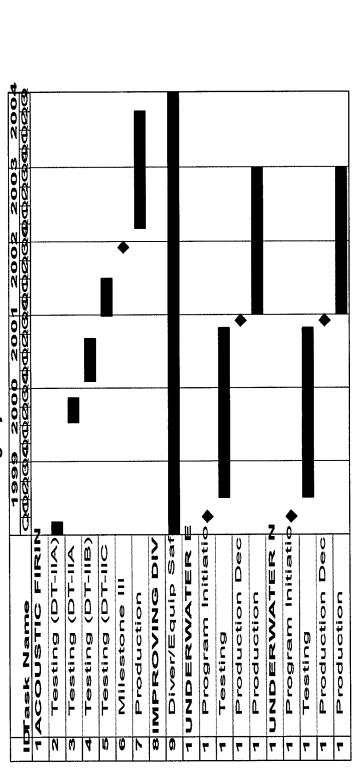
29 R-1 SHOPPING LIST - Item No.

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 11 of 15)

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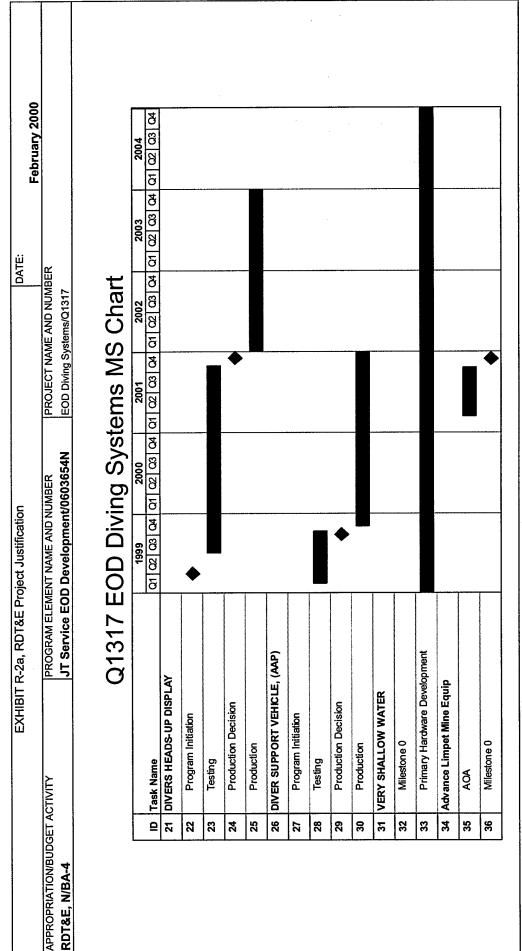
Q1317 EOD Diving Systems MS Chart



R-1 SHOPPING LIST - Item No. 59

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 12 of 15)

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R-1 SHOPPING LIST - Item No. 59

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 13 of 15)

UNCLASSIFIED

									DATE:				
Exhibit R-3 Cost Analysis (page 1)	ge 1)										February 2000	000	
APPROPRIATION/BUDGET ACTIVITY	/II/	<u>q</u>	PROGRAM ELEMENT	누			PROJECT N	PROJECT NAME AND NUMBER	MBER				
RDT&E, N/BA-4		<u>ŏ</u>	0603654N				EOD Diving	EOD Diving Systems/Q1317	4				
Cost Categories	Contract	Contract Performing	Total			FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Method Activity &	PΥs		FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost		Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Primary Hardware Development	WR	SPAWAR, SD, CA		1.500	1.130	10/98	1.000	10/99	0.770	10/00	Continuing	Continuing	N/A
Primary Hardware Development	WR	Various	14.	14.273	1.300	10/98	0.857	10/99	2.689	10/00	Continuing	Continuing	N/A
Software Development	WR	Various	0,6	0.600	0.133	10/98	0.158	10/99	0.200	10/00	Continuing	Continuing	A/N
Systems Engineering	WR	Varions	9.9	0.000	0.400	10/98	0.350	10/99	0.300	10/00	Continuing	Continuing	N/A
ILS	WR	Varions	10.	10.192	0.500	10/98	0.200	10/99	0.200	10/00	Continuing	Continuing	N/A
												0.000	
												0.000	
Subtotal Product Development			32.	32.565	3.463		2.565		4.159		Continuing	Continuing	N/A
Remarks:													
Program Management Support	C/CPEF	Dynamic System, Alex VA	L	1.418	0.428	01/99	0.440	01/00	0.450	01/01	1.150	Continuing	N/A

	C/CPFF	Dynamic System, Alex, VA	1.418	0.428	01/99	0.440	01/00	0.450	01/01	1.150	Continuing	N/A
Program Management Support	C/CPFF	C/CPFF TBD	0000	0.000		0.000		0.000		0.000	0.000	N/A
١											0.000	
											0000	
											0.000	
											0.000	
											0000	
Subtotal Support			1.418	0.428		0.440		0.450		1.150	Continuing	N/A
												•

Remarks:

R-1 SHOPPING LIST - Item No. 59

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 14 of 15)

UNCLASSIFIED

									DATE				
Exhibit R-3 Cost Analysis (page 2)	te 2)								į		February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	<u>II</u>		PROGRAM ELEMENT	LEMENT			PROJECT NA	PROJECT NAME AND NUMBER	IBER				
RDT&E, N/BA-4			0603654N				EOD Diving S	EOD Diving Systems/Q1317					
s , or System/Item				Total PY s	FY 99	FY 99 Award	FY 00	FY 00 Award	FY 01	FY 01 Award	Cost to	Total	Target Value
	& Type	Location		Cost	Cost	Date	2	Date 10/00	Cost	Date 10/00	Confinuing	Cost	or Contract
Descriptional Test & Evaluation	T	Various		0.450	0.150	10/98	0.320	10/99	0.340	10/00	Continuing	Continuing	N/A
	1	Sport		201.5	3	2						0.000	
												0.000	
Subtotal T&E				1.650	0.870		0.720		0.740		0.000	Continuing	N/A
Remarks:													
Program Management Personnel	WR	ЕОБТБ, ІН, МВ	٥	3.000	0.467	10/98	0.650	10/99	0.650	10/00	Continuing	Continuing	N/A
Miscellaneous	Various	Various		1.000	0.070	02/99	0.692	02/00	1.079	02/01	Continuing	Continuing	N/A
												0.000	
												0.000	
												0.000	
												0.000	
Subtotal Management				4.000	0.537		1.342		1.729		Continuing	Continuing	N/A
Remarks:													·
Total Cost				39.633	5.298		2.067		7.078		Continuing	Continuing	N/A
Remarks:													
				0 1 0 10	A CHODDING I ICT I IS NO	140 mg Mg	0						

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Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 15 of 15)

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EXHIBIT R-2, RDT&E Budget Item Justification	udget Item .	Justification				DATE:			
							Feb	February 2000	
APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NO!	R-1 ITEM NOMENCLATURE				
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY - BA 4	- BA 4			Cooperativ	e Engagem	Cooperative Engagement Capability 0603658N	ty 0603658N	1	
COST (\$ in Millions	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete	Total Cost
Total PE Cost	189.648	189.877	119.257	49.135	48.842	46.868	47.001	Cont.	Cont.
Cooperative Engagement Capability (CEC) K2039	115.111	114.296	119.257	49.135	48.842	46.868	47.001	Cont.	Cont.
Cooperative Engagement Capability (CEC) K2616	74.537	75.581	0.000	0.000	0.000	0.000	0.000	0.000	150.118
Quantity of RDT&E Articles									22

A. (U) Mission Description and Budget Item Justification: Cooperative Engagement Capability (CEC) significantly improves Battle Force Anti-Air Warfare (AAW) capability by coordinating all Battle Force AAW sensors into a single, real-time, composite track picture capable of fire control quality. CEC distributes sensor data from each ship and aircraft, distributed sensor data into a fire control quality track picture which is the same for all CUs. CEC data is presented as a superset of the best AAW sensor capabilities from each CU, all of which are integrated into a single input to each CU's combat weapons system. CEC will significantly improve our Battle Force defense in depth, including both local area or cooperating unit (CU), to all other CUs in the battle force through a real-time, line of sight, high data rate sensor and engagement data distribution network. CEC is highly resistant to jamming and provides accurate gridlocking between CUs. Each CU independently employs high capacity, parallel processing and advanced algorithms to combine all and ship defense capabilities against current and future AAW threats. Moreover, CEC will provide critical connectivityand integration of over-landair defense systems capable of countering emerging air threats, including land attack cruise missiles, in a complex littoral environment.

distributes ownship sensor and engagement data, is a high capacity, jam resistant, directive system providing a precision gridlocking and high throughput of data. The CEP is a high capacity distributed processor which is able to process force levels of data in a timely manner that allows its output to be considered real-time fire control data. This data is (U) CEC consists of the Data Distribution System (DDS), the Cooperative Engagement Processor (CEP), and Combat System modifications. The DDS encodes and passed to the ship's combat system as high quality data for which the ship can cue its onboard sensors or use the data to engage targets without actually tracking them.

R-1 SHOPPING LIST - Item No. 60

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 7)

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EXHIBIT R-2, RDT&E Budget Item Justification	DATE:
	February 2000
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE
RDT&E, N/BA 4	Cooperative Engagement Capability 0603658N
CITY IT CITY CHILD IN THE CONTRACT OF THE CONT	

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1999 ACCOMPLISHMENTS:

- (U) (\$ 54.800) Continued CEC hardware and software engineering efforts at Raytheon Systems Company, St. Petersburg, FL; completed AN/USG-2 Design Agent transition from John Hopkins University, Applied Physics Laboratory, Laurel, MD.

- 1.250) Initiated development of software baseline 2.2 (AEGIS Navy Area and Theater Wide TBMD integration) with Lockheed-Martin. (U) (\$ 24.200) Continued CEC TDA/DA engineering efforts at JHU/JAPL.
 (U) (\$ 35.500) Continued CEC E-2C integration efforts at PMA-231.
 (U) (\$ 1.690) Continued CEC E-2C integration (Lockheed-Martin).
 (U) (\$ 1.250) Initiated development of software baseline 2.2 (AEGIS Navy Area and Theater Wide TBMD integration) w
 (U) (\$ 9.726) Continued integration of CEC with Space Based IR Sensors (SBIRS) at Lockheed-Martin.
 (U) (\$ 7.667) Continued ACDS/CEC integration efforts (test support, correction of interoperability/interface problems).
 (U) (\$ 12.536) Continued T&E efforts; conducted engineering; software support; Integrated Logistics Support Planning).
 (U) (\$ 20.443) Continued T&E efforts; conducted engineering, developmental and operational testing.
 (U) (\$ 12.079) Continued Program Management support.

(U) FY 2000 PLAN:

- 9.900) Support at-sea prototypes, risk reduction, systems engineering, and software development which will help the production Area Air Defense (1) (\$ 89.200) Continue CEC hardware and software engineering efforts and DA efforts at Raytheon Systems Company, St. Petersburg, FL.
 (U) (\$ 10.800) Continue CEC TDA engineering efforts at JHU/APL.
 (U) (\$ 11.600) Continue CEC E-2C integration efforts at PMA-231.
 (U) (\$ 4.000) Continue development of software baseline 2.2 (AEGIS Navy Area and Theater Wide TBMD integration) with Lockheed-Martin.
 (U) (\$ 13.300) Continue T&E efforts; conduct engineering; software support; Integrated Logistics Support Planning).
 (U) (\$ 30.000) Continue T&E efforts; conduct engineering; developmental and operational testing.
 (U) (\$ 15.500) Continue Navy integration exercises and integration efforts.
 (U) (\$ 5.577) Continue Program Management support.
 (U) (\$ 5.577) Continue Program Management support.
 (U) (\$ 9.900) Support at-sea prototypes, risk reduction, systems engineering, and software development which will help the production Area Ai

Commander system meet Joint Interoperability requirements

Note: \$4.315M of the FY00 plan is that portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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(Exhibit R-2, page 2 of 7) Exhibit R-2, RDT&E Budget Item Justification

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EXHIBIT R-2, RDT&E Budget Item Justification		DATE:	February 2000	, 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA 4	R-1 ITEM N Cooperat	R-1 ITEM NOMENCLATURE Cooperative Engagement Co	R-1 ITEM NOMENCLATURE Cooperative Engagement Capability 0603658N		
(U) PROGRAM ACCOMPLISHMENTS AND PLANS: (Cont.)					
(U) FY 2001 PLAN: - (U) (\$ 35.300) Continue CEC hardware and software engineering efforts at Raytheon Systems Company, St. Petersburg, FL (U) (\$ 13.500) Continue CEC TDA engineering efforts at JHU/APL (U) (\$ 13.500) Continue CEC E-2C integration efforts at PMA-231.	on Systems Company,	St. Petersburg, FL.			
- (U) (\$ 2.000) Continue development of software baseline 2.2 (AEGIS Navy Area and Theater Wide TBMD integration) with Lockheed-Martin (U) (\$ 12,400) Continue field support (In-service Engineering; software support; Integrated Logistics Support Planning).	and Theater Wide TBN egrated Logistics Supp	4D integration) with out Planning).	Lockheed-Martin.	7	Total
 (U) (\$ 38.300) Continue T&E efforts; conduct engineering, developmental and operational testing. (U) (\$ 6.300) Continue Navy and integration exercises and integration efforts. (U) (\$ 5.057) Continue Program Management support. 	ational testing.				
B. (U) Program Change Summary:					
	FY 1999	FY 2000	FY 2001		
FY 2000 President's Budget:	195.462	114.931	98.203		
Appropriated Value:	196.123	190.931			
Adjustment to FY 1999/2000 Appropriated Value/ EX 2000 President's Budget	-6 475	-1.054	21.054		
FY 2001 PRES Budget Submit:	189.648	189.877	119.257		
Funding: The FY 1999 adjustments are due to a decrease for Congressional Undistributed reductions (\$-1.549); offset for Small Business Innovation Research (SBIR) (\$-4.609); and minor pricing adjustments (\$-0.317). The FY 2000 adjustment is due to an across-the-board budget reduction of (\$-1.054). The FY 2001 adjustments are due to the addition of (\$+22.250) to reduce technical risk associated with the change in the OPEVAL schedule; decrease for minor pricing adjustments (\$-0.189); an increase for	ibuted reductions (\$-1 an across-the-board bu OPEVAL schedule; dec	udget reduction of ((crease for minor pri	rall Business Innovation \$-1.054). The FY 2001 cing adjustments (\$-0.	n Research I adjustmen 189); an inc	(SBIR) (\$- is are due to rease for
adjustment of NWCF rates (\$0.10b); an increase of (\$0.014) for military/civilian pay increases, a decrease of (\$-0.614) for nonpay purchases inflation reduction; and a decrease of (\$-0.313) for active Navy operations.	ncreases; a decrease o	or (\$-0.814) ror non	pay purchases inflation	reduction;	and a decre

R-1 SHOPPING LIST - Item No. 60

Exhibit R-2, RDT&E Budget frem Justification (Exhibit R-2, page 3 of 7)

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EXHIBIT R-2, RDT&E Budget Item Justification	.wa	DATE:
		February 2000
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	
RDT&E, N/BA 4	Cooperative Engagement Capability 06036581	t Capability 0603658N
B. (U) Program Change Summary: (Cont.		

Schedule: Detailed TECHEVAL/OPEVAL schedule has been refined with Fleet schedulers and is planned for Feb-May 2001, with Milestone III rescheduled from July 2001 to November 2001. Because of the Milestone III revision, a fourth LRIP is now planned for FY 2001. A detailed schedule is provided on page 5.

Technical: Not applicable.

								7o	Total
C. (U) Other Program Funding Summary:	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Complete	Cost
OP,N (CEC) P-1 Item No. 70	81.730	60.157	15.853	117.329	147.279	115.197	137.874	616.793	1,363.120
SC,N (Various)	15.700	36.000	20.500	20.100	48.900	55.600	52.600	0.000	271.000
AP,N (E-2C) (BA-1/5)		12.700	24.200	19.700	8.000	31.200	23.200	386.100	505.100
O&M,N (CEC)	21.007	21.330	16.636	18.092	17.519	20.471	23.030	Continuing	Continuing

D. (U) ACQUISITION STRATEGY:

The CEC program was approved for Low Rate Initial Production (LRIP-1) in March 1998 and a sole source contract was awarded to Raytheon Systems (Company, St. Petersburg, FL. A follow-on procurement of eleven (11) additional systems (LRIP-2) was approved 14 May 1999. Full Rate Production (FRP) is planned for December 2001 following completion of OPEVAL.

The Navy, Raytheon Systems Company, and Lockheed-Martin Corporation have reached an agreement whereby:

- (a) Raytheon will be the design agent for Ship Self Defense System (SSDS) Mark 2, and design agent and implementor of CEC baseline 2.1 supporting SSDS Mark 2.
 - (b) Lockheed-Martin will be the design agent for CEC baseline 2.2 effort which supports CEC integration into the TBMD program. (c) The Navy will plan for full and open competition for procurement of CEC equipment and engineering support.

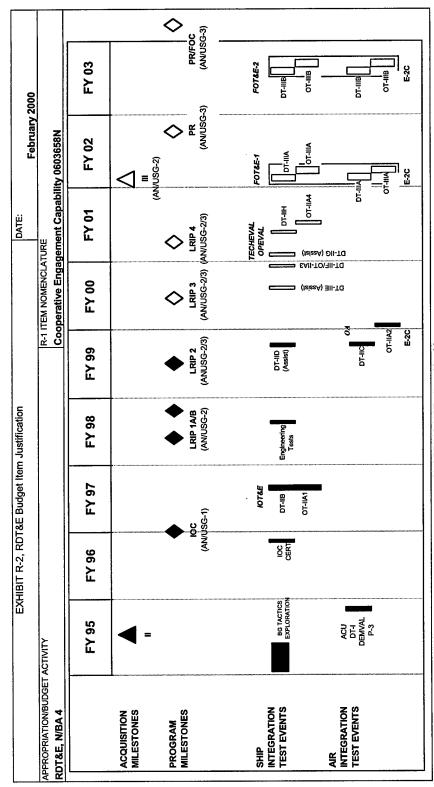
Concurrent contracts were awarded by the Navy on 30 April 1999 in accordance with the agreement, and award fees are structured to ensure cooperation between the contractors participate as members of a "Navy Review Team" of each other's design, and participate in a Navy-led task to define future architecture of CEC in a Battle Force context.

E. (U) SCHEDULE PROFILE: See Next Page.

R-1 SHOPPING LIST - Item No. 60

(Exhibit R-2, page 4 of 7) Exhibit R-2, RDT&E Budget Item Justification

CLASSIFICATION:



R-1 SHOPPING LIST - Item No. 60

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 5 of 7)

CLASSIFICATION:

								DATE:					
Exhibit R-3 Cost Analysis (page 1)	le 1)									February 2000	00		
APPROPRIATION/BUDGET ACTIVITY	≥	PROGRAM ELEMENT	EMENT			PROJECT NA	PROJECT NAME AND NUMBER	3ER					
RDT&E, N/BA 4		CEC - 06036	603658N			CEC - Project K2039	ect K2039						
Cost Categories	Contract	Contract Performing	Total		FY 99		FY 00		FY 01				
(Tailor to WBS, or System/Item	Method		PYs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total		Farget Value
(Requirements)	& Type	& Type Location	Cost	Cost	Date	Cost	Date		Date	Complete	Cost	7	of Contract
AN/USG-2/3 Development	C/CPAF	C/CPAF Raytheon, St. Peters., FL	432.693	54.800	96-voN C	89.200	66-voN (35.300	00-12O	4.000	0	615.993	TBD
AN/USG-2/3 Development/TDA	C/CPFF		174.833	24.200		10.800	Dec-99	13.500	00-12O	20.000	0	243.333	TBD
E-2C Aircraft Integration	C/CPAF	PMA-231	108.238	35.500	Oct-98	11.600	66-voN	6.400	00-120			161.738	
P-3 Aircraft Integration	C/CPAF	C/CPAF Lockheed-Martin	40.512	1.698								42.210	42.210
Baseline 2.2 Software Developmen	SS/CPAF	Lockheed-Martin		1,250		4.000) Feb-00	2.000	Oct-00	30.000	0	37.250	TBD
Space Based IR Sensors (SBIRS) C/CPAF Lockheed-Martin	C/CPAF	Lockheed-Martin	3.700	9.726	6 Aug-99							13.426	TBD
AEGIS Integration	C/CPAF	C/CPAF PMS-400	119.968									119.968	
ACDS Integration	C/CPAF	C/CPAF Raytheon (Hughes), LA, CA	26.266	7.667	7 Oct-98							33.933	TBD
In-Service Engineering Activity	WR	NSWC, Port Hueneme	0000	3.048	8 Mar-99	4.100	Dec-99	4.500				11.648	
Land Based Test Network	Оd	SPAWAR (PMW-159)	0000	1.361	1 Mar-99							1.361	
Land Based Test Network	PO	NATC, Patuxent River	0000	1.000	0 Mar-99							1.000	
Software Support Activity	WR	NSWC, Dahlgren, VA	28.677	3.838		4.700	Jan-00	3.800	Oct-00	CONT		CONT.	
ILS Planning	WR	NSWC, Crane, IN	19.982	3.289	9 Oct-98	4.500	Dec-99	4.100	Oct-00	CONT.		CONT.	
Area Air Def. Commander (AADC) C/CPAF TBD	C/CPAF	TBD				9.900				0.000	0	9.900	
Various	Various	Miscellaneous	67.977	12.079	9 Oct-98	15.500	Oct-99	6.300	Oct-00	CONT		CONT.	
Subtotal Product Development			1,022.846	159.456	9	154.300		75.900		CONT.		CONT.	
Remarks: (1) Award Date indicates initial authorization of funds: (2)	s initial au		Area Air Defense Commander (AADC) prime contractor to be determined.	ommander (/	VADC) prime α	ontractor to be	determined.						
				•									
											_		
											-	1	
		_		_		_						-	

0.000 0.000 0.000 Subtotal Support

Remarks:

R-1 SHOPPING LIST - Item No. 60

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 6 of 7)

UNCLASSIFIED

								DATE.			٠		
Exhibit R-3 Cost Analysis (page 2)	le 2)							i S	:	February 2000	000		
APPROPRIATION/BUDGET ACTIVITY	_ L	PROGRA	PROGRAM ELEMENT			PROJECT N	PROJECT NAME AND NUMBER	BER					
RDT&E, N/BA 4		CEC-0	0603658N			CEC - Project K2039	ect K2039						
Cost Categories	Contract	Contract Performing	Total		FY 99		FY 00		FY 01				•
(Tailor to WBS, or System/Item	Method	Activity &	ΡΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	<u> </u>	Target Value
Requirements)	& Type	Location	Cost	- 1	Da	Cost	Date	Cost	Date	Complete	Sec	5	or Contract
Land Based Test Network (DEP)	WR	NSWC, Dahlgren, VA		2.200					1			2.200	
Test Support	C/CPAF	C/CPAF Raytheon, St. Peters., I	FL	1.278	8 Mar-99	2.000	0 Nov-99	2.300	0ct-90	2.000	0	7.578	1 <u>1</u>
AEGIS Test Support	C/CPAF	C/CPAF PMS-400						5.200		-		5.200	
ACDS Test Support	C/CPAF	Raytheon (Hughes), LA, CA	, CA					3.000				3.000	
Test Support	C/CPFF	JHU/APL, Laurel, MD		1.800	10 Mar-99	2.500		2.500				6.800	TBD
Test Support	۸×		CA			2.300		2.500				4.800	
Test Support	WR	NRL, Washington, DC				2.000		2.100				4.100	
Test Support	WR	NSWC, Port Hueneme,	CA	7.787	17 Oct-98	4.100	0 Dec-99	4.100	Oct-00			15.987	
Test Support	8	SPAWAR (PMW-159)										0.00	
Air Operations Test Support	WR	COMNAVAIRLANT	1.700	0		3.200	0 Oct-99	4.600		4.000	0	13.500	
Air Operations Test Support	WR	NATC, Pax River	2.800	1.429	9 Mar-99				Oct-00	3.000	Q	7.229	
Test Requirements	WR	COMOPTEVFOR				09.	0 Jan-00	1.400	Oct-00	1.000	00	2.900	
Test Data Reduction	٧R	NWAS, Corona	5.500	1.000	00 Oct-98	2.500		1.000		1.50	Q	11.500	
P-3 Support/Target Procurement	8	NAVAIRSYSCOM				3.70		4.500	Oct-00	3.000	00	11.200	
ECM Test Support (BIG CROW)	MIPR	Kirkland AFB, NM				1.500	1	2.000				3.500	
Various	Various	Miscellaneous	37.20	7 4.949	96-12O 61	5.700	0 Oct-99	3.100	Oct-00	CONT	Į.	SONT	
Subtotal T&E			47.207	7 20.443	13	30.000	0	38.300		CONT.	T.	CONT.	
Remarks:													
Program Management Support	C/CPFF	C/CPFF Technautics, Alexandria	ia, VA 6.000	0 2.400	00ct-98	2.400	0 Nov-99	2.400				13.200	
Various	Various	Various Miscellaneous	26.738			3.177	Ш	2.657	Oct-90	CONT.	ı-i	CONT.	
Subtotal Management			32.738	9.749	61	5.577	7	5.057		CONT	Ŀ	CONT.	
Remarks:													-
1100			1 102 701	180 6/8	Įα	189 877	1	119 257		TNOO		CONT	
l otal Cost			1,102.73		2	0.50		110.60					
Remarks:													

R-1 SHOPPING LIST - Item No. 60

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 7 of 7)

UNCLASSIFIED

EXHIBIT R-2, RC	EXHIBIT R-2, RDT&E Budget Item Justification	ustification				DATE:	Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NO	R-1 ITEM NOMENCLATURE				
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4	NAVY/BA-4			Program Eler	nent (PE) Nar	ne and No. O	cean Engine	Program Element (PE) Name and No. Ocean Engineering Development 0603713N	0603713N
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	14.070	16.712	15.371	16.052	14.330	14.615	14.908	CONT.	CONT.
Deep Submergence Biomedical Development/S0099	3.976	3.756	3.668	3.710	3.867	3.944	4.023	CONT.	CONT.
Shallow Depth Diving Equipment/S0394	10.094	12.956	11.703	12.342	10.463	10.671	10.885	CONT.	CONT.
Quantity of RDT&E Articles								CONT.	CONT.

Mission Description and Budget Item Justification: Developments in this program will enable the U.S. Navy to overcome deficiencies that constrain underwater operations in the areas of search, location, rescue, recovery, salvage, construction, and protection of offshore assets. This program develops medical technology, diver life support equipment, vehicles, systems, and tools to permit manned underwater operations. Ą

B. Program Change Summary:

Funding: The FY 1999 decrease of \$1.187M is due to Congressional undistributed reductions and FY 1999 midyear reprogrammings to finance higher priority emergent requirements. The FY 2000 decrease of \$0.101M is due to Congressional undistributed reductions. The FY 2001 reduction of \$0.918M is due to pricing adjustments.

Schedule: Not applicable.

Technical: Not applicable.

R-1 SHOPPING LIST - Item No. 61 - 1 of 61 - 11

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 11)

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E Pro	Project Justification	ification				DATE:			
								Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	EMENT NAME	AND NUMBE	2	PROJECT NAME AND NUMBER	WE AND NUMI	3ER			
RDT&E,N/BA-4	Ocean Engi	neering Dev	relopment (603713N	Deep Submer	gence Biome	Ocean Engineering Development 0603713N Deep Submergence Biomedical Development/S0099	ment/S0099		
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2002 FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		3.976	3.756	3.668	3.710	3.867	3.944	4.023	CONT.	CONT.
RDT&E Articles Qty										

and rescue; and for diver safety and effectiveness; supports deeper, longer, safer, more flexible dives. Deliverables include: a) exposure guidance for atmospheric A. Mission Description and Budget Item Justification: Develops advanced biomedical/bioengineering technology for enhancing medical and life support for submarine escape submarine escape and rescue (including new Submarine Rescue Diving and Recompression System, SRDRS), prevention and treatment of decompression illness, c) technologies to assess underwater noise and life support parameters; enable non-chemical CO2 scrubbing; predict decompression risk in diving; provide senior survivor with expert decision system, and enhance underwater swimming efficiency. Requirements: Deep Submergence Biomedical Development (NAPDD #429-873) of 29 March 95. contaminants, underwater continuous and impulsive noise, underwater blast, oxygen breathing, and diving depth/time profiles; b) medical procedures for life support,

Program Accomplishments and Plans:

FY 1999 Accomplishments:

depth, water temp, decompression stress) during operational dives. Delivered tables of pulmonary and central nervous system (CNS) oxygen toxicity and identify methods to protection garment specifications; issue guidance for swimming efficiency. Delivered dive site capability to measure underwater sound exposure. Developed procedures for assessing underwater blast/impulse noise hazards; identify underwater acoustic threats to divers and develop strategy to protect divers; issued standardized tool noise - (\$2.049) Diver Health and Safety Research: Delivered integrated set of diving decompression tables for air and nitrox. Developed methods to record variables (e.g. time, prevent CNS oxygen toxicity. Develop one-atmosphere treatment protocols for decompression sickness using large animals. Develop adjustable, non-tethered diver thermal assessment instruction.

R-1 SHOPPING LIST - Item No. 61-2 of 61-11

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 2 of 11)

UNCLASSIFIED

EXHIBIT R-2a, RDT&E Project Justification	February 2000	GET ACTIVITY PROGRAM ELEMENT NAME AND NUMBER PROJECT NAME AND NUMBER	Ocean Engineering Development 0603713N Deep Submergence Biomedical Development/S0099
		APPROPRIATION/BUDGET ACTIVITY	RDT&E, N/BA-4

- (\$1.927) Submarine Rescue: Delivered Submarine escape and rescue Senior Survivor Expert decision aid (SEAREX) hardware & software, plus training recommendations trial, publish effects of low oxygen and high carbon dioxide on oxygen consumption; published new guidance for passive CO2 scrubbing. Continue work on nitrox for class SSN 688. Determined impact of hypothermia on crew survival in disabled submarine, refine estimates of crew escape time in disabled submarine scenario by actual decompression and efforts to develop alternative decompression protocol for air saturated divers for the Deep Submergence Rescue Vehicle (DSRV) and SRDRS.

FY 2000 Plan:

- (\$1.877) Diver Health and Safety Research: Develop new underwater thermal protection garments. Develop guidance for acceptable underwater breathing apparatus Conduct manned test of one-atmosphere treatments for decompression sickness with divers. Determine damage risk thresholds for underwater blast/impulse noise. Develop respiratory loads present in combination. Produce diving at altitude decompression tables. Deliver validated scaling procedures from animals to humans for decompression. protective materials and procedures against underwater sound threats to divers.
- new markers for re-entry into fire-contaminated spaces. Publish revised Pressurized Submarine Rescue Manual. Develop guidance for decompression in SRDRS. Provide - (\$1.879) Submarine Rescue: Deliver SEAREX and Guard Book package for Ohio class submarines. Issue DISSUB atmosphere contaminant exposure guidance. Deliver alternative to electrically-powered or passive CO2 scrubbing.

FY 2001 Plan:

guidance for acceptable UBA respiratory loads in combination. Continue development of new diver thermal protective garments with industry, and begin prototype - (\$ 1.867) Diver Health and Safety Research: Final integration of USN decompression tables across gases, pressures, mixes, and repetitions. Updated performance standards for non-UBA diving gear. Deliver human exposure limits for underwater blast. Assess efficacy of prototype underwater swimmer protection strategies. Deliver evaluations. Issue recommendations to manufacturers for procedures to reduce drag underwater.

R-1 SHOPPING LIST - Item No. 61-3 of 61-11

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 3 of 11)

UNCLASSIFIED

EXHIBIT R-2a, RDT&E Project Justification	February 2000	BUDGET ACTIVITY PROGRAM ELEMENT NAME AND NUMBER PROJECT NAME AND NUMBER	Ocean Engineering Development 0603713N Deep Submergence Biomedical Development/S0099
		APPROPRIATION/BUDGET ACTIVITY	RDT&E, N/BA-4

- (\$1.801) Submarine Rescue: Determine allowable surface intervals for escapers and rescuees from pressurized DISSUB. Determine actual escape times from SSN 688 and SSBN 726 classes. Provide SEAREX package for SEAWOLF class. Develop SEAREX decision aid for New Attack Submarine (NSSN). Develop SRDRS biomedical acceptance criteria.
- B. Other Program Funding Summary: FY99; SBIR reduction -\$.292M. FY00: \$.300M of the extramural program is reserved for SBIR assessment IAW 15 USC 638.

Related RDT&E: Not Applicable.

- C. Acquisition Strategy: Integrated thrust area teams (e.g. decompression research) are established with university, commercial and in-house Navy lab to jointly execute biomedical R&D; peer review of research proposals accomplished by independent Technical Advisory Board; annual review of progress by Executive Review Board (CNO/NAVSEA/ONR/BUMED); program management by 0-6 Medical Dept Officer; contracting by competitive process using BAA and leveraging ONR capabilities.
- D. Schedule Profile: Not applicable

R-1 SHOPPING LIST - Item No. 61-4 of 61-11

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 4 of 11)

CLASSIFICATION:

Exhibit K-3 Cost Analysis (bade 1)	Ę								i :		February 2000	00	
APPROPRIATION/BUDGET ACTIVITY		4	PROGRAM ELEMENT	EMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E, N/BA-4		<u> </u>	Ocean Engineering D	neering De	evelopment 0603713N	0603713N		Deep Submergence Biomedical Developmental/S0099	edical Develo	pmental/S00	66		
	Contract	Contract Performing		Total		FY 99		FY 00		FY 01			
or System/Item	Method	Activity &	-	PΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
		Location			Cost	Date	Cost	Date		Date	Complete	Cost	of Contract
are Development	1											0.000	
Ancillary Handware Development												0.000	
Systems Engineering												0000	
iconses												0.000	
Tooling												0.000	
nuc.												0.00	
												0.000	
Award rees				0000	38		0000		000		000	0000	
Subtotal Product Development				0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: Not Applicable.													
Development Support Equipment												0.000	
Software Development												0.000	
Training Development		***************************************										0.000	
Integrated Logistics Support												0.000	
Configuration Management												0.000	
Technical Data												0.000	
GEE												0.000	
Subtotal Support				0.000	0000		0.000		0000		0.000	0.000	

Remarks: Not Applicable.

R-1 SHOPPING LIST - Item No. 61-5 of 61-11

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 5 of 11)

UNCLASSIFIED

R-1 SHOPPING LIST - Item No. 61-6 of 61-11

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 6 of 11)

UNCLASSIFIED

	EXHIBIT R-2a, RDT&E Project .	oject Justification				DATE:	Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY PROGRAMMENT&E.N/BA-4 Ocean	PROGRAM ELEMENT NAME AND NUMBER Ocean Engineering Development 0603713N Shallow Depth Diving Equipment/S0394	AME AND NUMBI Development	ER 0603713N	PROJECT NAME AND NUMBER Shallow Depth Diving Equipme	ME AND NUMI Diving Equi	BER pment/S0394			
OST (\$ in Millions)	FY 1999	9 FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost	10.094	12.956	11.703	12.342	10.463	10.671	10.885	CONT.	CONT.
RDT&E Articles Qtv									

certifiable diving systems that ensure diver safety and allow maximum work efficiency will replace currently antiquated systems. Efforts are currently focused on the Submarine Rescue Diving and Recompression System (SRDRS) to provide a new rapidly deployed emergency submarine rescue capability. SRDRS will fill the gap created submarine directly to the decompression system eliminating the requirement for Deep Submergence Rescue Vehicles, Mother Submarines and Submarine Rescue Chambers. SRDRS is to include an air transportable rapid assessment/underwater work system, a decompression chamber system and a pressurized rescue module. The SRDRS will provide a global rapid response capability to support submarine rescue missions with an increase in capability at a fraction of the cost of the currently available Diver operations include ship husbandry, salvage/recovery, and submarine rescue operations to support national, as well as, Navy needs around the world. Modern by the decommissioning of USS PIGEON (ASR 21) and USS ORTOLAN (ASR 22) and provide a new capability of pressurized transportation of rescuees from a stricken A. Mission Description and Budget Item Justification: This project is to develop systems to support submarine escape and rescue missions, and conventional diver operations.

Program Accomplishments and Plans:

FY 1999 Accomplishments:

System. Continue fabrication of the prototype Submarine Decompression System. Solicit for detailed design and fabrication of the Pressurized Rescue Module. Complete - (\$10.094) Submarine Rescue Diving and Recompression System: Complete acquisition of and continue acceptance testing of the prototype assessment/Underwater Work design and award contract for Submarine Decompression System support equipment.

R-1 SHOPPING LIST - Item No. 61-7 of 61-11

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 7 of 11)

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	DATE:	
			February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	Ocean Engineering Development 0603713N	ring Development 0603713N Shallow Depth Diving Equipment/S0394	

FY 2000 Plan:

- (\$12.956) Submarine Rescue Diving and Recompression System: Complete acceptance testing of the prototype Assessment/Underwater Work System. Complete fabrication and acceptance testing of the prototype Submarine Decompression System and support equipment. Complete contract award for detailed design and fabrication of prototype Pressurized Rescue Module.

FY 2001 Plan:

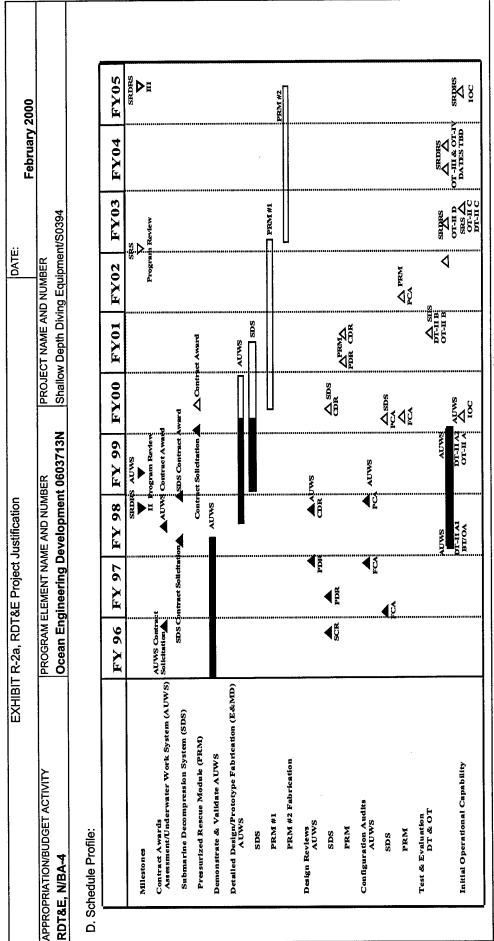
- (\$11.703) Submarine Rescue Diving and Recompression System: Continue design and fabrication of prototype Pressurized Rescue Module.
- B. Other Program Funding Summary: Not applicable.

Related RDT&E: Not Applicable.

C. Acquisition Strategy: The Atmospheric Diving Suit (ADS) Segment of the SRDRS is a Non-Developmental Item (NDI) which is procured via a sole source contract. The Submarine Rescue System (SRS) segment of the SRDRS is largely based on the use of Commercial-Off-the-Shelf (COTS) technology and maximum use of Non-Developmental Items (NDI). The SRS segment is being procured using performance based specifications. The SRS contracts will be awarded competitively and will be based on technical capability and cost considerations (best value). Program Management of SRDRS is accomplished through the use of SEA 00C leadership of an Integrated Product Team (IPT). The Prototype system will provide full operational capability and no additional procurement is planned. The system is designed to be Government Owned/Commercially Operated (GO/CO).

R-1 SHOPPING LIST - Item No. 61-8 of 61-11

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2, page 8 of 11)



R-1 SHOPPING LIST - Item No.

61-9 of 61-11

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 9 of 11)

CLASSIFICATION:

								DATE:				
Exhibit R-3 Cost Analysis (page 1)	e 1)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	<u>_</u>	PROGRAM ELEMENT	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	IBER				
RDT&E, N/BA-4		Ocean En	Ocean Engineering De	evelopment 0603713N	0603713N	Shallow Dep	Shallow Depth Diving Equipment/S0394	ipment/S039	4			
Cost Categories	Contract	Performing	Total		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Activity &	PΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Primary Hardware Development	WR	NSWC - CSS	16.259	1.960	12/98	1.600	12/99				18.219	
	CPAF	Oceaneering	9.078								9.078	9.078
	l	NAVFACCO	0.900	2.340	12/98						7.655	
	L,	GPC	0.000	1.756	03/99	4.415	11/99				1.756	1.756
	Various	Miscellaneous	1.985	0.263		4.358		8.203		CONT.	CONT.	
Ancillary Hardware Development											0.000	
Systems Engineering	CPAF	Oceaneering		2.892	12/98	1.754	12/99	3.000		CONT.	CONT.	
											0.000	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees	CPAF	Oceaneering	0.597	0.232	12/98	0.140	12/99				0.969	0.829
	CPAF	GPC	0.000	0.067	66/60	0.189	11/99				0.067	0.067
Subtotal Product Development			28.819	9.510		12.456		11.203		CONT.	CONT.	
Remarks: Award Fees are 6%.												
Development Support Equipment											0000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	

Remarks:

R-1 SHOPPING LIST - Item No. 61-10 of 61-11

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 10 of 11)

UNCLASSIFIED

								DATE				
Exhibit R-3 Cost Analysis (page 2)	ge 2)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	/ITY	PROGR/	PROGRAM ELEMENT			PROJECT N	PROJECT NAME AND NUMBER	MBER				
RDT&E, N/BA - 4		Ocean	Ocean Engineering Do	evelopment 0603713N	: 0603713N	Shallow Der	oth Diving Equ	Shallow Depth Diving Equipment/S0394	4			
Cost Categories		Performing	Total	00 25	FY 99	00 X	FY 00	EV 04	FY 01	در معلومی	Total	Tarret Value
(Tailor to Wbs, or systemintem Requirements)	& Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Developmental Test & Evaluation		Miscellaneous	0.529									
Operational Test & Evaluation												
Tooling												
GFE										1	!!	
Subtotal T&E			0.529	0000		0.000		0.000		CONT.	CONT.	
	<u> </u>	:		-				 		Fisco	Ŀ	
Contractor Engineering Support	Various	Miscellaneous	0.316	0.327		0.400		0.400		CON .	CON .	
Government Engineering Support	WR	NFESC	0.095	0.172	12/98					CONT.	CONT.	
Program Management Support			0.050	0.085		0.100		0.100		CONT	CONT	
Labor (Research Personnel)			0.453								0.453	0.453
Overhead												
Subtotal Management			0.914	0.584		0.500		0.500		CONT.	CONT.	
Total Cost			30.262	10.094		12.956		11.703		CONT.	CONT.	
Remarks:					·							
			R-1 SHO	R-1 SHOPPING I IST - Item No	- Item No	61-11 of 61-11	1-11					

R-1 SHOPPING LIST - Item No. 61-11 of 61-11

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 11 of 11)

CLASSIFICATION:

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	EXHIBIT R-2, F	R-2, RDT&E Budget Item Justification	t Item Justifie	cation		DATE:			
							Febr	February 2000	,
APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE	MENCLATURE				
RESEARCH DEVELOPMENT TEST & EVALUATION, BA4	I, BA4			Environmental	Environmental Protection / PE0603721N	=0603721N			
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	70.404	82.999	62.194	45.181	44.315	44.439	44.670	Cont	Cont
Shipboard Waste Mgmt / S0401	43.073	55.273	48.557	29.607	27.981	27.789	27.546	Cont	Cont
Env Compliance / W2210	4.278	4.497	4.820	5.096	5.373	5.494	5.671	Cont	Cont
Aviation Depot Maint Tech / W2623*	1.936	1.989						0.0	3.925
Pollution Abatement / Y0817	8.588	9.306	8.817	10.478	10.961	11.156	11.453	Cont	Cont
Asbestos Removal / Y2402*	3.855	3.978						0.0	9.720
Resource Recovery Tech Center / Y2403*	6.747	7.956						0.0	18.477
Molten Salt Oxidation / Y2622*	1.927							0.0	1.927

compliance with existing and anticipated laws with regard to four major areas: 1) ozone depleting substances, 2) solid wastes, 3) liquid wastes, and 4) hazardous and other ship wastes. Project W2210 supports development of environmental systems for naval aviation operations to enable compliance with environmental laws and regulations and minimize the cost associated with environmental compliance. A. (U) Mission Description and Budget Item Justification: This program develops processes, prototype hardware, systems, and operational procedures that will allow the Navy to operate in the U.S., foreign and international waters, air, space, and land areas while complying with U.S. statutes and international agreements. The program also includes efforts to improve the Navy's response to salvage-related pollution incidents. Projects support the Navy's requirement to meet environmental standards outlined by Environmental Protection Agency Executive Order 12088 of October 1978, Act to Prevent Pollution from Ships, Endangered Species Act, Marine Mammal Protection Act, Endangered Species Act, Clean Air Act, Clean Water Act, DoD Directive 6050.4 of 16 March 1982, DoD Directive 4210.15 of 27 July 1989, DoD Directive 6050.15 of 14 June 1985, DoD Directive 6050.9 of 13 February 1989, and OPNAVINST 5090.1B CH-1 of 2 February 1998. Project S0401 supports RDT&E efforts that allow the Navy to be in Project Y0817 supports and validates development of technologies to enable facilities to comply with environmental laws and regulations in a cost effective manner.

* Projects W2623, Y2402, Y2403, and Y2622 are Congressional adds.

R-1 - Item No. 62-1 of 62-21

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 21)

CLASSIFICATION:

EXHIBIT R-2, RDT&	EXHIBIT R-2, RDT&E Budget Item Justification	DATE:		
	•		February 2000	
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM	R-1 ITEM NOMENCLATURE		
RESEARCH DEVELOPMENT TEST & EVALUATION, BA4	Environm	Environmental Protection / PE 0603721		_
B. (U) Program Change Summary:	EV 1000	EV 2000	EV 2004	
	6661	7000	2007	_
FY 2000 President's Budget:	71.170	70.793	64.373	
Appropriated Value:	71.170	82.793		
Adjustment to FY 1999/2000 Appropriated Value/				
FY 2000 President's Budget:	-0.766	12.206	-2.179	
FY 2001 DON Budget Submit:	70.404	82.999	62.194	
(U) Funding:				

EY 1999 Reduction of \$0.766M reflects general Undistributed Reductions (-\$0.647M), SBIR Transfer (-1.119M), and ASN(RD&A) restoration of funds for Uniform National Discharge Standards (UNDS) development (+\$1.000M).

EY 2000 Increase of \$12.206M reflects N86 sponsor reprogramming for Project S0401 for Advanced Undersea Warfare Concept (-\$1.333M); FY00 Congressional add for Resource Recovery Technology Center - Y2403 (+8.0M); FY00 Congressional add to Asbestos Removal - Y2402 (+\$4.0M); Program Budget Decision for Aviation Depot Maintenance - W2623 (+\$2.0M); undistributed reductions (-\$0.461M); and minor pricing adjustments.

FY 2001 Reduction of \$2.179M.

(U) Schedule: Not applicable. (U) Technical: Not applicable.

R-1 - Item No. 62-2 of 62-21

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 2 of 21)

CLASSIFICATION:

	EX	EXHIBIT R-2a, RDT&E Project Justification	RDT&E Proj	ect Justifica	tion		DATE:			
			•					Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM EL	PROGRAM ELEMENT NAME AND NUMBER	E AND NUMBE	æ	PROJECT NAME AND NUMBER	WE AND NUM	BER			
RDT&E, BA4	Environme	Environmental Protection / PE0603721N	ion / PE060	3721N	Shipboard Waste Management / S0401	ste Manageme	nt / S0401			
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Shipboard Waste Management / S0401		43.073	55.273	48.557	29.607	27.981	27.789	27.546	Cont	Cont
RDT&E Articles Qtv										
Oily Waste Polishing System - Engineering Development Models		1-\$1M	1-\$1M	1-\$0.4M						
Non-Oily Waste Polishing System - Engineering Development Models		1-\$1M	1-\$1M	1-\$1M		1-\$0.6M				
Non-CFC Refrigerant Replacement Kits - Engineering Development Models		1-\$0.5M								
Liquid Waste Thermal Destruction - Engineering Development Models			2-\$3M		1-\$2M		1-\$0.9M			
Shipboard Pollution Prevention - Test Articles		27-\$0.5M						2-\$0.8M		
Solid Waste - Engineering Development Models		1-\$0.7M	1-\$2M	1-\$2M						
Underwater Hull Cleaning - Engineering Development Models				1-\$0.7M		1-\$0.9M				

A. (U) Mission Description and Budget Item Justification

1. (U) FY 1999 ACCOMPLISHMENTS:

& 150-ton CFC-114 air-conditioning plant designs. Continued development of backfit modification kits for surface ship 300-ton and 363-ton CFC-114 air-conditioning plant designs. Continued development and systems. Completed development of alternative solvents and processes for oxygen systems cleaning applications. Completed development of Alternative Firefighting Agent Delivery System (AFFADS) for (U) (\$13.812M) Ozone Depleting Substances - Completed evaluation of first submarine refrigeration plants converted to HFC-134a. Continued development of backfit modification kits for surface ship 125-ton initiated qualification of backfit modifications for remaining surface ship 250-ton CFC-114 air-conditioning plant designs. Continued one-year at-sea ship test and evaluation of HFC-236fa backfit modifications in 200-ton CFC-114 air-conditioning plants. Completed laboratory evaluations of future fleet non-chlorofluorocarbon 200-ton centrifugal air-conditioning plant and 1.5-ton refrigeration plant prototypes to qualify new ship construction and initiated evaluation of non-ODS fire protection concepts and systems for future surface combatants. (U) (\$20.280M) Integrated Liquid Wastes - Continued support of rulemaking process with Environmental Protection Agency (EPA) in development of Uniform National Discharge Standards (UNDS) for liquid waste discharges from Navy vessels: completed Phase I, determination of incidental discharges requiring Marine Pollution Control Devices (MPCDs); and initiated Phase II, setting of MPCD performance standards. Continued development of integrated liquid waste treatment system: continued development of integrated liquid waste treatment system: continued development of 10-gal/min unit Oily Waste Polishing System (OWPS) (OWS-10 Polisher) and continued development of 50-gal/min OWPS (OWS-50 Polisher); continued development of Engineering Development Model (EDM) non-oily wastewater treatment system; continued development of advanced Oil Content Monitor (OCM); and continued test and evaluation of upgraded shipboard vortex sewage incinerator. Continued development of design fixes for compensated fuel ballast systems. Completed development of High-Capacity Oil/Water Separator (HCOWS). Completed testing of Non-Seeping Grease Seal on submarine dive and steering gear.

(U) (\$3.635M) Solid Wastes - Continued development of management processes and systems for plastics for submarine application: performed Temporary Alterations (TEMPALTs) of prototype equipment aboard two SSN-688 Class submarines and conducted at-sea test & evaluation; investigated onboard storage techniques and locations for SSBN-726 Class submarines. (U) (\$5.346M) Hazardous and Other Major Ship Wastes - Continued shipboard hazardous materials substitution and elimination task and continued Test and Evaluation (T&E) of pollution prevention equipment aboard ship. Issued final report for Non-Asbestos Substitutes (NAS). Continued quality assurance testing on reformulated commercial paints. Continued development of oil spill response capabilities: completed development of computer-based contingency planning system; completed development of in-situ oil burning system; continued development of Recovered Oil Logistics System; continued development of oil outflow and salvage response analysis program; and continued development of oil and skimmer tracking system. Initiated development of marine mammals ship database

R-1 - Item No. 62-3 of 62-21

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 3 of 21)

CLASSIFICATION:

	EXHIBIT R-2a, RDT&E Project Justification		DATE:
			February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	ER
RDT&E, BA4	Environmental Protection / PE0603721N	Shipboard Waste Management / S0401	it / S0401

2. (U) FY 2000 PLAN:

- (U) (\$11.167M) Ozone Depleting Substances Complete development of backfit modification kits for surface ship 125-ton & 150-ton CFC-114 air-conditioning plant designs. Complete development of backfit modification kits for surface ship 300-ton and 363-ton CFC-114 air-conditioning plant designs. Complete one-year at-sea ship test and evaluation of HFC-236fa backfit modifications in 200-ton CFC-114 airconditioning plants. Continue development and qualification of backfit modifications for remaining surface ship 250-ton CFC-114 air-conditioning plant designs. Continue evaluation of non-ODS fire protection concepts and systems for future surface combatants.
- (U) (\$27.906M) Integrated Liquid Wastes Continue support of rulemaking process with EPA in development of UNDS for liquid waste discharges from Navy vessels: continue Phase II, setting of MPCD performance standards. Continue development of integrated liquid waste treatment system: continue development of 10 gal/min OWPS (OWS-10 Polisher), continue development of 5-gal/min combined OWPS (OWS-5 Polisher) for new-construction ships; continue development of EDM non-oily wastewater treatment system; continue development of advanced OCM; complete test and evaluation of upgraded shipboard vortex sewage incinerator; and initiate development of advanced thermal destruction system for concentrated ship liquid wastes. Continue development of design fixes for compensated fuel ballast systems.
- (\$7.200M) Solid Wastes Continue development of management processes and systems for plastics for submarine application: convert SSN-688 Class submarine TEMPALT to a Ship Alteration (U) (\$7.200M) Solid Wastes - Continue development of management processes and systems for plastics for submarine application: convert SSN-688 Class submarine TEMPALT to a Ship Alteration (SHIPALT) and upgrade test submarines; perform TEMPALTs of prototype equipment aboard two SSBN-726 Class submarines and conduct at-sea test and evaluation; investigate onboard storage techniques and locations for SSN-21 Class submarines; and initiate investigation of onboard storage techniques and locations for SSN-774 Class submarines. Initiate development of advanced thermal destruction system for processing shipboard solid wastes.
- quality assurance testing on reformulated commercial paints. Continue development of oil spill response capabilities: complete development of oil outflow and salvage response analysis program; complete skimmer tracking system; continue development of Recovered Oil Logistics System; and initiate development of oil and skimmer efficiency improvements. Continue development of Complete (U) (\$9,000M) Hazardous and Other Major Ship Wastes - Continue shipboard hazardous materials substitution and elimination task and continue T&E of pollution prevention equipment aboard ship. marine mammals ship database tracking system. Initiate development and testing of new low-copper underwater hull antifouling coatings. Initiate development of underwater hull cleaning system.

3. (U) FY 2001 PLAN:

(U) (\$5.998M) Ozone Depleting Substances - Complete development and qualification of backfit modifications for remaining surface ship 250-ton CFC-114 air-conditioning plant designs. Continue evaluation of non-ODS fire protection concepts and systems for future surface combatants.

R-1 - Item No. 62-4 of 62-21

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 4 of 21)

CLASSIFICATION:

	February 2000		
ation DATE:		PROJECT NAME AND NUMBER	Shipboard Waste Management / S0401
EXHIBIT R-2a, RDT&E Project Justification		PROGRAM ELEMENT NAME AND NUMBER	Environmental Protection / PE0603721N
		APPROPRIATION/BUDGET ACTIVITY	RDT&E, BA4

performance standards. Continue development of integrated liquid waste treatment system: continue development of OWS-10 Polisher, continue development of OWS-50 Polisher, and continue development (U) (\$27,759M) Integrated Liquid Wastes - Continue support of rulemaking process with EPA in development of UNDS for liquid waste discharges from Navy vessels: continue Phase II, setting of MPCD of OWS-5 Polisher; complete development of advanced OCM; continue development of EDM non-oily wastewater treatment system; and continue develoment of advanced thermal destruction system for concentrated ship liquid wastes. Continue development of design fixes for compensated fuel ballast systems. (U) (\$5.400M) Solid Wastes - Continue development of management processes and systems for plastics for submarine application: convert SSBN-726 Class submarine TEMPALT to SHIPALT and upgrade techniques and locations for test submarines; perform TEMPALT of prototype equipment aboard SSN-21 Class submarine and initiate at-sea test and evaluation; and continue investigation of onboard storage techniques and locations for SSN-774 Class submarines. Continue development of advanced thermal destruction system for processing shipboard solid wastes.

(U) (\$9.400M) Hazardous and Other Major Ship Wastes - Continue shipboard hazardous materials substitution and elimination process and continue T&E of pollution-prevention equipment aboard ship. Continue development of oil spill response capabilities: complete development of Recovered Oil Logistics System; continue development of oil and skimmer efficiency improvements; and initiate development of light-oil recovery modifications. Continue development of marine mammals ship database tracking system: initiate demonstration. Continue development and testing of new low-copper underwater hull antifouing coatings. Continue development of underwater hull cleaning system. B. (U) Other Program Funding Summary: Demonstrated and validated technologies are transitioned to various SCN, OPN, and O&MN budget accounts for implementation as part of a Fleet modernization program or new ship construction.

- (U) Related RDT&E: (U) Defense Research Sciences/Shipboard Processes (PE 61153N/R3162)(U) Readiness, Training, and Environmental Quality/Logistics and Environmental Quality (PE 62233N)(U) Environmental Quality and Logistics Advanced Technology/Environmental Requirements Advanced Technology (PE 63712N/R2206)
- C. (U) Acquisition Strategy: (U) RDT&E Contracts are Competitive Procurements.

R-1 - Item No. 62-5 of 62-21

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 5 of 21)

CLASSIFICATION:

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LAATE:	February 2000	JMBER	ment / S0401		EY01	Complete Development Remaining 250T A/C Modification Kits	Complete UNDS Phase III (MPCD Guidelines) Complete Development OWS-50 Polisher Complete Development Future OWS-3 Polisher	Complete Development Advanced OCM	Complete SSN-688 Plastics T&E Aboard Ship SSN-21 Plastics TEMPALT & Initiate T&E	Complete Hazardous Materials Eimination/Substitution Complete Pollution Afroat Initiale Light-Off Recovery System Modifications Initiate Marine Memmal Database Demonstration
EVUIDIT D 22 DDT&E Drainct Instituation	ווס ימר דיספני טמאווונמווטו	E AND NUMBER PROJECT NAME AND NUMBER	Protection / PE0603721N Shipboard Waste Management / S0401		FY00	Complete Development 125T & 150T CFC-114 A/C Modification Kits Complete Ship Test 200T CFC-114 A/C Modification Complete Development 300T & 363T CFC-114 A/C Modification Kits	Complete UNDS Phase II (MPCD Performance Standards) Intitate UNDS Phase III (MPCD Guidelines) Complete Development OWS-10 Polisher	Initiate Development Future OWS-3 Polisher	SSBN-726 Plastics TEMPALT & Initiate T&E Investigate SSN-21 Plastics Storage Techniques Initiate Development Advanced Thermal Destruction System	Complete Test Reformulated Paints Complete Development Oil Configency Planning System Complete Development Oil Coulflow/Salvage Program Complete Development In-Situ Oil Burning System Initiate Development Oil & Skimmer Improvements & OWS Initiate Development Underwater Hull Coatings Initiate Development Underwater Hull Geaning System
SC O TIGITAL		/ITY PROGRAM ELEMENT NAME AND NUMBER	Environmental Protecti			Completed Evaluation First Submarine Refrigeration Plant Modifications Complete Development 125T & 150T CFC-114 A/C Modification Kits Completed Evaluation Future 200T A/C & 1.5T Refrigeration Prototypes Complete Ship Test 200T CFC-114 A/C Modification Completed Development Alternative Solvenis for 0.2 Systems Completed Development AFFADS for New Ships	Completed UNDS Phase I (Discharges Requiring MPCD) Initiated UNDS Phase II (MPCD Performance Standards)	Completed Development High-Capacity OilWater Separator Completed Test Sub Non-Seeping Grease Seal	SSN-688 Plastics TEMPALT & Initiate T&E Investigated SSBN-726 Plastics Storage Techniques	Issued Final Report Non-Asbestos Substitutes Initiated Development Marine Mammal Database
CEASON ICANION:		APPROPRIATION/BUDGET ACTIVITY	RDT&E, BA4	o di constante di	D. (U) Suredula Fluile.	Ozone Depleting Substances Com Com Com	integrated Liquid Wastes Com	Com	Shipboard Solid Wastes SSN-Inves	Hazardous & Other Major Ship Wastes Issue

R-1 - Item No. 62-6 of 62-21

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 6 of 21)

			EXHIBIT R-3, Cost Analysis (page 1)	3, Cost Anal	ysis (page 1,			DATE				
				•	;					February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	<u></u> LII	PROGRAM ELEMENT	LEMENT			PROJECT NA	PROJECT NAME AND NUMBER	IBER				
RDT&E. BA4		Environme	Environmental Protection / PE0603721N	tion / PE06(13721N	Shipboard Wa	Shipboard Waste Management / S0401	ant / S0401				
Cost Categories	Contract	Contract Performing	Total		FY 99		FY 00					
(Tailor to WBS, or System/Item	Method		PY s	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total Cost	Target Value
Kequirements)	å iype			9	Date	9	Care	1500		V/14	44 500	14 580
Primary Hardware Development	C/CPFF	Westinghouse Machinery Tech Div, Pitts, PA	14.580	0.000	K N	0.000	Ψ/N	0.000	ď.	W/N	14.300	14.300
Primary Hardware Development	C/CPFF	C/CPFF Geo-Centers, Inc., Boston, MA	7.450	6.300	01/99	4.000	12/99	6.500	12/00	Cont	Cont	Υ V
Primary Hardware Development	SS/CPFF	SS/CPFF York International Corp York, PA	2.700	0.000	N/A	0.000	W/A	0.000	N/A	N/A	2.700	2.700
Primary Hardware Development	SS/CPFF	SS/CPFF York International Corp	4.800	3.550	04/99	3.000	05/00	2.500	02/01	11.150	25.000	25.000
Primary Hardware Development	SS/CPFF	SS/CPFF Northern Research & Engineering Corp, Waburn, MA	1.200	0.000	N/A	0.000	N/A	0000	A/N	N/A	1.200	1.200
Primary Hardware Development	C/CPFF	M. Rosenblatt & Son New York, NY	7.163	2.200	01/99	6.000	01/00	3.450	01/01	Cont	Cont	A/N
Ancillary Hardware Development	Various		15.110	0.000	N/A	1.000	N/A	1.274	A/N	N/A	N/A	Ϋ́Z
Systems Engineering	C/CPFF		2.087	1.500	01/99	2.000	12/99	3.050	12/00	Cont	Cont	Y Z
Subtotal Product Development			55.090	13.550		16.000		16.774		Cont	Cont	ΑΝ
Remarks: (1) Hardware Development and Systems Engineering Tasks use CPFF Delivery Order Contracts for Continuing Development of Pollution Abatement Hardware and Ship Systems Engineering Analysis	nent and S	ystems Engineering Tasks us	se CPFF Delive	ry Order Conti	racts for Contin	uing Developm	ent of Pollution	n Abatement F	lardware and S	Ship Systems Engi	ineering Analysis	
Software Development	Various	Misc. Contracts	0.070	0.000	01/00	0.000				0.000	0.070	0.070
Training Development											0.000	
preparated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
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Remarks: Not Applicable.

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Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 7 of 21)

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				o, cost 21 la	ysis (page 4.	,				February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	<u>L</u>	PROGRAM ELEMENT	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E, N		Environme	Environmental Protect	ection / PE0603721N	3721N	Shipboard Wa	Shipboard Waste Management / S0401	ent / S0401				
Cost Categories	Contract	Performing			FY 99				FY 01			:
(Tailor to WBS, or System/Item	Method	Activity &	PY s Cost	FY 99 Cost	Award	FY 00	Award Date	FY 01 Cost	Award Date	Cost to	Total Cost	Target Value of Contract
Developmental Test & Evaluation		NSWC Carderock Div, Bethesda. MD	3.824	22.500	A/N	2967	4	22.400	N/A	Cont	Cont	N/A
Developmental Test & Evaluation	WR	Naval Research Lab Wash, DC	15.082	4.000	N/A	3.350	N/A	3.045	N/A	Cont	Cont	ΑΝ
Developmental Test & Evaluation	WR	NCCOSC San Diego, CA	2.710	0.600	W/A	0.250	A/N	0.250	N/A	Cont	Cont	ΝΆ
Developmental Test & Evaluation	WR	NNSY Norfolk. VA	4.158	0.635	N/A	1.000	N/A	1.000	N/A	Cont	Cont	N/A
Developmental Test & Evaluation	WR	Misc. Govt Labs	15.825	0.714	N/A	0.150	N/A	0.450	A/N	Cont	Cont	N/A
Developmental Test & Evaluation	C/CPFF	Geo-Centers, Inc. Boston, MA	8.651	0.500	01/99	4.000	12/99	1.500	12/00	Cont	Cont	V/A
Developmental Test & Evaluation	C/CPFF	York International Corp, York , PA	12.000	0.000	N/A	0.000	N/A	0.000	N/A	0:000	12.000	12.000
Developmental Test & Evaluation	C/CPFF		6.866	0.574	Var	5.556	Var	3.138	Var	Cont	Cont	A/N
Subtotal T&E			129.116	29.523		39.273		31.783		0.000	Cont	N/A
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel											0.000	
Labor (Research Personnel)											000.0	
Overhead Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: Not applicable.												
Total Cost			184.276	43.073		55.273		48.557		Cont	Cont	Cont
Remarks:												

R-1 - Item No. 62-8 of 62-21

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 8 of 21)

CLASSIFICATION

	X	EXHIBIT R-2a, I	RDT&E Proj	T R-2a, RDT&E Project Justification	tion		DATE:			
								Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM EL	PROGRAM ELEMENT NAME AND NUMBER	AND NUMBE	R	PROJECT NAME AND NUMBER	ME AND NUM	3ER			
RDT&E, BA4	Environmental		Protection / PE0603721N	3721N	Environmental Compliance / W2210	Compliance / \	N2210			
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Environmental Compliance / W2210		4.278	4.497	4.820	5.096	5.373	5.494	5.671	Cont	Cont
RDT&E Articles Qty										

aviation pollution prevention efforts were previously supported by Project Y0817, Pollution Abatement Ashore. This project will support that part of project Y0817 that addressed aviation pollution prevention technologies as well as additional operational and shipboard aviation requirements previously unsupported. Specific regulatory requirements include Executive Orders 12856 (Pollution Prevention) and 12873 (Recycling & Waste Prevention), the Clean Air Act (CAA) and associated National Emission Standards for Hazardous Air Pollutants (NESHAPs) and National Ambient Air Quality Standards (NAAQS), the compliance with international, federal, state, and local regulations and policies; reduction of increasing compliance costs and personal liability; and enhancement of naval aviation mission effectiveness. Naval A. (U) Mission Description and Budget Item Justification: This project supports development and implementation of technologies which will lead to environmentally safe naval aviation operations and supports Clean Water Act (CWA), the Resource Conservation and Recovery Act (RCRA), as well as Occupational, Safety and Health Administration (OSHA) standards.

1. (U) FY 1999 ACCOMPLISHMENTS:

- (U) (\$2.454M) Continued to research, develop and test: Alternatives for cadmium, chromium, and cyanide plating nonchromate aluminum pre-treatments, and sealants; non-hazardous chemical paint stripping processes; alternative non-hazardous solvents and cleaners; low/non-VOC coatings; and non-hazardous corrosion control materials and processes.
- (U) (\$0.850M) Continued to evaluate alternative aircraft systems to eliminate or reduce the emission of hazardous materials.
- (U) (\$0.889M) Continued to demonstrate performance of water-borne topcoats. Developed and tested hazardous operational chemical and material alternatives. Developed and demonstrated technologies for control of ordnance and composite material emissions.
- (U) (\$0.085M) A Below Theshold Reprogram (BTR) reducing funding for higher Navy priorities was received.

2. (U) FY 2000 PLAN:

(U) (\$2.625M) Continue to research, develop, and test alternatives to aircraft finishing, repair and maintenance processes that use toxic heavy metals, hazardous air pollutants (HAPs), and volatile organic compounds (VOCs). Formulate and certify newly developed aircraft coatings. Continue technology research development, demonstrations/validations of alternatives to chromium and cadmium electroplating processes. Develop and validate source reduction in aircraft wash and de-icing. Develop and demonstrate alternative propulsion system technologies that minimize the use and generation of hazardous materials in manufacturing and repair processes. Complete development and demonstration of the following technologies: waterborne topcoats, electrocoat/powder coat, flashjet, non-HAPs paint purge solvents, non-HAPs chemical strippers, zinc/nickel plating as a cadmium replacement, tin-zinc plating as a cadmium replacement, CO2 retrofit of portable chloro-flouro carbon (CFC) fire extinguishers, reduction of halon 1301 release during maintenance and glass bead media recycling.

R-1 - Item No. 62-9 of 62-21

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 9 of 21)

CLASSIFICATION:

	EXHIBIT R-2a, RDT&E Project Justification		DATE:
			February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	:R
RDT&E, BA4	Environmental Protection / PE0603721N	Environmental Compliance / W2210	2210

- (U) (\$0.290M) Continue to provide scientific and technical expertise for continued aviation pollution prevention technology development, demonstration, and validation.
- (U) (\$0.535M) Continue to develop and demonstrate low VOCs, non-chromated adhesive bonding primers, and aluminum-manganese electroplating as a cadmium replacement.
- (U) (\$0.440M) Continue to develop and demonstrate conversion coatings alternatives.
- (U) (\$0.280M) Initiate development and demonstration of alternative ordnance materials and processes, innovative industrial wastewater source reduction technology that minimizes hazardous waste generation and toxic emissions to the atmosphere.
- (U) (\$0.327M) Initiate development and demonstration of environmentally compatible Aircraft Launch and Recovery Equipment (ALRE) lubricants and certify processes that reduce their emission to the sea.
- 3. (U) FY 2001 PLAN:
- (U) (\$2.858M) Continue to research, develop, and test alternatives to aircraft manufacturing, finishing, repair and maintenence processes that use toxic heavy metals, hazardous air pollutants (HAPs), and volatile organic compounds (VOCs). Continue to formulate and certify newly developed aircraft coatings. Continue technology research development, demonstrations/validations of alternatives to chromium and cadmium electroplating processes. Continue to develop and validate source reduction in aircraft wash and de-icing. Continue to develop and demonstrate alternative propulsion system technologies that minimize the use and generation of hazardous materials in operations, manufacturing and repair processes. Initiate development of Low Emissions Technology. Complete development of conversion coatings alternative, non-chromated paint primers, non-HAP sealants, mobile paint stripping technology, non-HAPs pre-paint cleaner, composite materials alternatives.
- (U) (\$0.290M) Continue to provide scientific and technical expertise for continued aviation pollution prevention technology development, demonstration, and validation.
- (U) (\$0.535M) Continue to develop and demonstrate low volatile organic compound (VOC), non-chromated adhesive bonding primers, waterborne topcoats, non-HAP chemical strippers, non-HAP paint purge solvents, electroplating and aluminum-manganese as a cadmium (CD) replacement.
- (U) (\$0.445M) Complete development and demonstration of conversion coatings alternatives.
- (U) (\$0.280M) Continue development and demonstrate alternative ordnance materials and processes, innovative industrial wastewater source reduction technology that minimizes hazardous waste generation and toxic emissions to the atmosphere.
- (U) (\$0.412M) Continue development and demonstrate environmentally compatible Aircraft Launch and Recovery Equipment (ALRE) lubricants and certify processes that reduce their emission to the sea.

R-1 - Item No. 62-10 of 62-21

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 10 of 21)

CLASSIFICATION:

	EXHIBIT R-2a, RDT&E Project Justification	ation DATE:	
			February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, BA4	Environmental Protection / PE0603721N	Environmental Compliance / W2210	

B. (U) Other Program Funding Summary: Not applicable.

(U) RELATED RDT&E: (U) PE 0602233N (Readiness/Training/Environmental Quality) (U) PE 0603716D (Strategic Environmental R&D Program) (U) PE 0603851D (Environmental Security Technology Certification Program) (U) PE 0603721N (Environmental Quality & Logistics Advanced Technology) (U) PE 060864N (NAVAIR Environmental Compliance)

C. (U) Acquisition Strategy: Technologies developed under this project are demonstrated and validated primarily through Competitive Procurements. Validated technology is transitioned to users through new or revised Performance Specifications, Technical Manuals or Competitive Procurements of subsystems, materials or processes.

Comp Eval Waterborne Topcoats 78 D. (U) Schedule Profile: Engineering Milestones

Cont Eval Waterborne Topcoats
Cont Eval Electrocoat & Powder Coat
Cont Dev Zh-Ni Plating as Cd Replacement
Cont Dev Sh-Zn Plating as Cd Replacement
Cont Dev Sh-Zn Plating as Cd Replacement
Cont Dev Rashjer
Cont Dev Paint Puge Sowents
Cont Dev Paint Puge Sowents
Cont Eval Glass Bead Media Recyding
Cont Eval CO2 Retrofit of Halon Extinguishers
Cont Eval Halon Releases During Bottle Maint

Comp Dev Non-Chromated Primers
Comp Dev Mobile Paint Simpling Technology
Comp Eval Non-HAPs Prepaint Cleaner
Comp Eval Composite Materials Alternatives
Init Dev Low Emissions Technology Comp Dev Conv Coating Alternatives Comp Dev Zn-Mi Plating as Cd Replacement Comp Comp Dev Sn-Zn Plating as Cd Replacement Comp Comp Dev Flashigh of the Comp Comp Dev Plating the Comp Comp Dev Plating Solvents Comp Comp Dev Plating Solvents Comp Comp Dev Plating Solvents Comp Comp Eval Glass Bead Media Recycling Init Dev Env Compatible ALRE Lubricants Init Dev Alternative Ordnance Materials & Processes Comp Eval Cot2 Retrofit of Halon Exinguishers Comp Eval Halon Releases During Bottle Maint Comp Eval Electrocoat & Powder Coat

Init Eval Wastewater Source Reduction

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 11 of 21)

CLASSIFICATION:

			ш	EXHIBIT R-3	EXHIBIT R-3, Cost Analysis (page 1)	ysis (page 1	(1		DATE:				
											February 2000	000	
APPROPRIATION/BUDGET ACTIVITY	<u> </u>	ď	PROGRAM ELEMENT	EMENT			PROJECT N	PROJECT NAME AND NUMBER	MBER				
RDT&E, BA4		<u>ü</u>	Environmental Protect	ntal Protect	ction / PE0603721N	3721N	Environment	Environmental Compliance /W2210	W2210				
Cost Categories	Contract	Contract Performing				FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Method Activity &		PYs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	Location	J		Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Primary Hardware Development													
Ancillary Hardware Development													
Systems Engineering	ΧM	Various			1.739		1.872		1.962		Cont	Cont	Cont
	××	NAWC-Pax			2.444		2.613		2.843		Cont	Cont	Cont
		BTR for Higher Navy Priorities	Vavy Priorities	S	980'0								
Subtotal Product Development				0.000	4.268		4.485		4.805		Cont	Cont	Cont
Remarks:													
Software Development													
Training Development													
Integrated Logistics Support													
Configuration Management													
Technical Data													
GFE													
Subtotal Support				0.000	0.00		0.00		0000		0.000	0.000	

Subtotal Support
Remarks: Not Applicable.

R-1 - Item No. 62-12 of 62-21

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 12 of 21)

CLASSIFICATION:

PROGRAM ELEMENT PROGRAM ELEMENT PROGRAM ELEMENT	Environmental Prot Environmental Prot Total PY s Cost	PROJECT NAME AND NUMBER Environmental Compliance M2210 FY 00 FY 00 Award Cost Date Cost 0.000 0.000		FY 01 Award Cost to Comple	uary 200	otal .	Target Value of Contract N/A N/A
Contract Performing Contract Performing Method Activity & & Type Location Ion		Nironmental Complianc Vironmental Complianc FY 00 Award ost Date 0.000			1	Cont	Farget Value of Contract N/A N/A
Contract Performing Method Activity & & Type Location Ion		vironmental Compliano 7 00 Award ost Date 0.000				Cont	Target Value of Contract N/A N/A
Contract Performing Total PY's FY'99 & Type Location Cost Cost Cost Cost Cost Cost Cost Cost	Total FY 6 Cost Cost Cost Cost Cost Cost Cost Cost	000			±	Cont	Target Value of Contract N/A N/A
Method Activity & PY's FY'99 & Type Location Cost Cost On One Cost Cost One Cost Cost One Cost One Cost One Cost One Cost One Cost One Cost One Cost One Cost One Cost	PY s FY Cost Cost Cos	000		_	±	Cont	Farget Value of Contract N/A N/A
& Type Location Cost Cost ion 0.000 0.000	Cost Cos	000			 	Cont	of Contract N/A N/A
00000 00000	00000	0000			Cont	Cont	N/A
00000		0.000					N/A
0000		0000			Cont	Cont	
0000			0.000		0.000	Cont	N/A
0000							
00:00						0.000	
0000						0.000	
000'0	0.010	0.012	0.015		Cont	Cont	Cont
search Personnel) 0.000 Management 0.000 cs: Not applicable. 0.000						0.000	
Management 0.000 cs: Not applicable.						0.000	
0.000						0.000	
Remarks: Not applicable.		0.012	0.015		0.000	Cont	
Total Cost 4.278	4.278	4.497	4.820	Cont		Cont	Cont
Remarks:							

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Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 13 of 21)

CLASSIFICATION:

	EX	EXHIBIT R-2a, I	RDT&E Proj	R-2a, RDT&E Project Justification	ion		DATE:		z.	
								Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM EL	PROGRAM ELEMENT NAME AND NUMBER	: AND NUMBE		PROJECT NAME AND NUMBER	ME AND NUM	3ER			
RDT&E, BA4	Environmental F	ntal Protecti	Protection / PE0603721N		Pollution Abatement / Y0817	ement / Y0817				
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Pollution Abatement / Y0817		8.588	9.306	8.817	10.478	10.961	11.156	11.453	Cont	Cont
RDT&E Articles Qty										
										-

shore activities by the need to comply with environmental laws, regulations, orders, and policies. The goal of the program is to minimize personnel flabilities, operational costs, and regulatory oversight while preserving or enhancing the ability of Naval shore activities to accomplish their required missions and functions. Each project task addresses one or more of the requirements from the Navy Environmental Quality RDT&E Strategic Plan of October 1994. The plan is being updated and upon Chief of Naval Operations approval it will govern future task selections. Project investment is made in five thrust areas: A. (U) Mission Description and Budget Item Justification: This project develops and validates new technologies needed to address pervasive Navy shoreside environmental requirements imposed on Naval

(U) SHIP MAINTENANCE/REPAIR/DEACTIVATION

(U) Thus far, tasks in this thrust area have addressed environmental requirements originating at Naval shipyards. As the Navy pursues a strategy to reduce ship maintenance costs by shifting work to Ship Intermediate Maintenance Activities (SIMAs), new requirements are emerging as these processes and resulting hazardous waste streams become more decentralized. SIMAs will require technologies that are cost-effective when operated less frequently and with lower throughput. Future SIMA tasks will be selected based on compliance and pollution prevention studies being conducted on the Naval Station Mayport SIMA as part of the Navy Environmental Leadership Program (NELP) during FY 1999.

(U) ORDNANCE TESTING/MANUFACTURE/DISPOSAL

(U) Current tasks in this thrust address specific compliance-driven environmental requirements of Navy ordnance activities. With respect to disposal, the thrust addresses requirements for disposal of quantities typical of testing and manufacturing operations, not of the much larger quantities associated with demilitarization. Future tasks will shift much of the investment in this area to pollution prevention requirements, particularly where they also reduce compliance impacts and costs. These tasks will be identified as part of an ordnance environmental requirements study being conducted in partnership with the Navy's Ordnance Environmental Specialty Office (OESO) during FY 1999.

(U) OTHER INDUSTRIAL OPERATIONS

overall Navy strategy, future tasks will shift more of the investment from compliance technologies to pollution prevention technologies that are cost-effective solutions to compliance requirements. It is also (U) Tasks in this thrust address compliance and pollution prevention environmental requirements originating from the industrial operations of Navy Public Works Centers and Naval Stations. As part of an expected that there will be new requirements driven by the trend towards stricter federal, state, and local air emission regulations.

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 14 of 21)

CLASSIFICATION:

	EXHIBIT R-2a, RDT&E Project Justification	ation DATE:	
	•		February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, BA4	Environmental Protection / PE0603721N	Pollution Abatement /Y0817	

(U) NON-INDUSTRIAL OPERATIONS

(U) Tasks in this thrust address requirements to reduce air and water emissions (CAA, CWA), hazardous waste (RCRA) generation, and cost of environmental compliance for non-industrial operations occurring at Naval activities. In addition, tasks evaluate alternative restoration technologies for the over 1000 Navy sites requiring cleanup and restoration under CERCLA. The alternative restoration tasks are selected and linked to the urgent requirements of specific restoration projects in partnership with the Navy's Alternative Restoration Technology Team (ARTT). It is expected that one area requiring new investment is technologies to reduce the long-term operation and monitoring costs of installation restoration projects.

(U) HAZARDOUS WASTE MINIMIZATION/RECYCLING/DISPOSAL

(U) Prior tasks have shown that the Navy neither has the funding required to acquire a new government-owned hazardous waste treatment system nor a large enough hazardous waste stream to make a new contractor-owned treatment plants (IWTPs) and/or to pre-treat Navy-generated contractor-owned treatment systems profitable. Tasks now primarily address requirements to upgrade capabilities of Navy-owned industrial waste treatment plants (IWTPs) and/or to pre-treat Navy-generated wastes prior to being discharged to publicly-owned wastewater treatment systems (POWTS).

1. (U) FY 1999 ACCOMPLISHMENTS:

(U) (\$2.385M) Ship Maintenance/Repair/Deactivation - Completed development of Bilge Derusting and Pacification Chemicals: validation of system to recycle citric acid used for the derusting and pacification of ship bilges. Completed development of Recycling of Shipyard Hazardous Waste Using Catalytic Extraction Process: feasibility of recycling hazardous wastes generated by the deactivation of submarines and ships using a contractor owned and operated facility based on molten metal technology. Completed development (evaluation) of alternatives for reduction of Hexavalent Chromium Emission Reduction Reduction Reduction from Shipyard Cutting from Shipyard Welding Operations. Continued development of Automated Paint Application with Overspray Capture and Treatment. Continued development of Air Emission Reduction from Shipyard Cutting and Arc-Gouging Operations. (U) (\$2.560M) Ordnance Testing/Manufacture/Disposal - Completed development of Marine Sediment Toxicity Data for Ordnance Compounds. Continued development of Strubber for Static Testing of Small Rocket Motors: design phase 2 prototype. Continued development of Confined Burn Facility to Replace Open Burning of Ordnance and Energetics: test 10-pound capacity prototype. Completed evaluation of Electrochemical Oxidation for Destruction of Waste Energetic Materials. (U) (\$1.527M) Other Industrial Operations - Completed development (validation) of Leak Detection System for Large Underground Bulk Fuel Storage Tanks. Continued Jet Engine Test Cell Emissions Reduction. Initiated development of In-Line Monitoring and Diversion for Problem Contaminants in Discharges: sensor and valve components needed for systems to automatically detect and divert occasional wastewater discharges with treatment-resistant contaminants.

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 15 of 21)

CLASSIFICATION

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			February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, BA4	Environmental Protection / PE0603721N	Pollution Abatement /Y0817	
Comp Comp Comp Comp Comp Comp Comp Comp	. 1		

development of Environmentally Sound Fire Fighting Training Facilities. Continued development of Reduced False Positive From Marine Sediment Bioassays. Initiated development of Methods to Assess Toxicity Analysis Using DNA Integrity. Completed development of In-Situ Remediation of Contaminants Using Fenton's Reagent. Continued development of Sound Propagation Over Water Model Corrections for Navy-Unique Scenarios. Continued development of QwirSet Marine Sediment Bioassays Using Bioluminescent Dinoflagellates. Continued development of Subsurface Contaminant Transport and DNAPL Sensor System. Continued development of integrated Field Screening for Rapid Sediment Contaminant Characterization. Continued development of Pier-Side Oil Spill Detection System. Continued (U) (\$1.267M) Non-Industrial Operations - Completed development (validation) of Controlling Non-Point Source Discharges Using Constructed Wetlands. Completed development of Sub-Lethal Biochemical Subsurface Contaminant Migration From Coastal Landfills. (U) (\$0.849M) Hazardous Waste Minimization/Recycling/Disposal - Completed development (validation) of Plasma Arc Waste Treatment Technology. Completed development of Contaminated Sediment Volume Minimization Using Particle Separation. Completed Evaluation of Waste Paint Disposal and Recycling Alternatives. Continued development of Options for Recycling Rags Contaminated With RCRA Wastes. Continued Transition of Cyanide Wastewater Treatment Technologies from Navy Exploratory Development (6.2) Program. Initiated development of Shoreside Collection and Treatment System for Compensated Fuel Tank Ballast Water. Initiated development of Total Toxic Organic Reduction for Navy Industrial Waste Treatment Plants.

2. (U) FY 2000 PLAN:

(U) (\$2.429M) Ship Maintenance/Repair/Deactivation - Complete development of Automated Paint Application with Overspray Capture and Treatment. Complete development of Air Emission Reduction from Shipyard Cutting and Arc-Gouging Operations. Initiated tasks addressing Ship Intermediate Maintenance Activity (SIMA) requirements identified during compliance and pollution prevention studies conducted on Naval Station Mayport SIMA as part of Navy Environmental Leadership Program (NELP) during FY99. (U) (\$1.929M) Ordnance Testing/Manufacture/Disposal - Continue development of Exhaust Scrubber for Static Testing of Small Rocket Motors: initiate fabrication of phase 2 prototype. Continue development of Confined Burn Facility to Replace Open Burning of Ordnance and Energetics: initiated tasks to address requirements identified as part of ordnance environmental requirements study conducted in partnership with Navy's Ordnance Environmental Specialty Office (OESO) during FY99.

Continue development of In-Line Monitoring and Diversion of Problem Contaminants in Discharges to automatically detect and divert occasional wastewater discharges with treatment-resistant contaminants. Initiate tasks to address requirements identified as part of update of Navy Environmental Quality RDT&E Strategic Plan completed during FY99; it is expected that there will be new requirements driven by (U) (\$2.140M) Other Industrial Operations - Complete development of Jet Engine Test Cell Emissions Reduction: complete validation of approaches to reduce nitrous oxide, particle, and noise emissions. stricter federal, state, and local air emission regulations.

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 16 of 21)

CLASSIFICATION:

	EXHIBIT R-2a, RDT&E Project Justification	ation DATE:		
			February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER		,
RDT&E, BA4	Environmental Protection / PE0603721N	Pollution Abatement /Y0817		

- Bioassays Using Bioluminescent Dinoflagellates. Complete development of Subsurface Contaminant Transport and DNAPL Sensor System. Complete development of Integrated Field Screening for Rapid development of Reduced False Positive From Marine Sediment Bioassays. Continue development of Methods to Assess Subsurface Contaminant Migration from Coastal Landfills. Initiate tasks to address (U) (\$1.935M) Non-Industrial Operations - Complete development of Sound Propagation Over Water Model Corrections for Navy-Unique Scenarios. Complete development of QwikSet Marine Sediment requirements identified as part of update of Navy Environmental Quality RDT&E Strategic Plan completed during FY99; it is expected that one area requiring new investment is technologies to reduce the long-Sediment Contaminant Characterization. Complete development of Pier-Side Oil Spill Detection System. Continue development of Environmentally Sound Fire Fighting Training Facilities. term operation and monitoring costs of installation restoration projects
- Treatment Technologies from Navy Exploratory Development (6.2) Program. Continue development of Shoreside Collection and Treatment System for Compensated Fuel Tank Ballast Water. Continue development of Total Toxic Organic Reduction for Navy Industrial Waste Treatment Plants. Initiate additional tasks for Volume and Contaminants Reduction in Wastewater Discharged to Navy-Owned (\$0.873M) Hazardous Waste Minimization/Recycling/Disposal - Complete development of Options for Recycling Rags Contaminated with RCRA Wastes. Complete Transition of Cyanide Wastewater Industrial Waste Treatment Plants (IWTPs) and Publicly-Owned Wastewater Treatment Systems (POWTS).

3. (U) FY2001 PLAN:

- (U) (\$2.157M) Ship Maintenance/Repair/Deactivation Continue tasks addressing Ship Intermediate Maintenance Activity (SIMA) requirements identified during compliance and pollution prevention studies conducted on Naval Station Mayport SIMA as part of Navy Environmental Leadership Program (NELP) during FY99.
- (U) (\$1.690M) Ordnance Testing/Manufacture/Disposal Continue development of Exhaust Scrubber for Static Testing of Small Rocket Motors: complete fabrication of phase 2 prototype. Continue development of Confined Burn Facility to Replace Open Burning of Ordnance and Energetics: continue tasks to address requirements identified as part of ordnance environmental requirements study conducted in partnership with Navy's Ordnance Environmental Specialty Office (OESO) during FY99.
- wastewater discharges with treatment-resistant contaminants. Continue tasks to address air emissions reductions requirements identified as part of update of Navy Environmental Quality RDT&E Strategic (U) (\$2.090M) Other Industrial Operations - Complete development (validation) of In-Line Monitoring and Diversion of Problem Contaminants in Discharges to automatically detect and divert occasional Plan completed during FY99
- (U) (\$1.990M) Non-Industrial Operations Complete development of Environmentally Sound Fire Fighting Training Facilities. Complete development of Reduced False Positive From Marine Sediment Bioassays. Complete development of Methods to Assess Subsurface Contaminant Migration from Coastal Landfills. Continue tasks to reduce long-term operation and monitoring costs of installation restoration projects as identified by updated Navy Environmental Quality RDT&E Strategic Plan completed during FY99.
- (U) (\$0.890M) Hazardous Waste Minimization/Recycling/Disposal Complete development (validation) of Shoreside Collection and Treatment System for Compensated Fuel Tank Ballast Waste. Complete development of Total Toxic Organic Reduction for Navy Industrial Waste Treatment Plants. Continue Volume and Contaminants Reduction in Wastewater Discharged to Navy-Owned Industrial Waste Treatment Plants (IWTPs) and Publicly-Owned Wastewater Treatment Systems (POWTS).

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page ∜7 of 21)

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			February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, BA4	Environmental Protection / PE0603721N	Pollution Abatement /Y0817	

Certification Program (ESTCP), for certification and by providing funding for Navy participation in ESTCP projects that could address Navy requirements. Within this program element, the project looks for fund leveraging opportunities with Project S0401 and W2210. Execution of this project is coordinated with related Army and Air Force programs by the Tri-Service Environmental Quality R&D Strategic Plan (U) Other Program Funding Summary: This project transitions technologies from PE0603712N, Environmental Quality, Logistics Advanced Technology Demonstrations Program, and PE0603716D, the Strategic Environmental Research and Development Program (SERDP). Whenever possible, funding is leveraged by transitioning technologies to PE 0603851D, the Environmental Security Technology developed under the leadership of the Joint Engineers Management Panel (JEMP). Additional coordination occurs between the Army, Navy, and Air Force centers for environmental excellence.

Program (SERDP). Project funding is leveraged by transitioning technologies to the Environmental Security Technology Certification Program (ESTCP) for final certification and by providing funding for Navy participation in ESTCP projects. Execution of this project is coordinated with related Army and Air Force programs by the Tri-Service Environmental Quality R&D Strategic Plan developed under the leadership (U) RELATED RDT&E: This project transitions shoreside pollution abatement technologies from two Navy Science and Technology programs and the Strategic Environmental Research and Development of the Joint Engineers Management Panel (JEMP)

PE 0602233N, Readiness, Training, and Environmental Quality Technology Development (U) PE 0602233N, Readiness, Training, and Environmental Quality Technology Developmes
 (U) PE 0603712N, Environmental Quality, Logistics Advanced Technology Demonstrations
 (U) PE 0603716D, Strategic Environmental Research & Development Program (SERDP)
 (U) PE 0603851D, Environmental Security Technology Certification Program (ESTCP)

equipment products costing less than 100K, and process changes not requiring the purchase of new equipment such as consumable material or product substitutions, are funded through the activity's operating budgets. Occasionally there is a technology that must be implemented as a specialized facility. These are acquired through the Military Construction (MCON) Program. All these acquisition processes are pursued using a common strategy that satisfies the needs of all the critical stakeholders: 1) Navy end user; 2) Funding sponsor for the Navy end user; 3) Cognizant environmental federal, C. (U) Acquisition Strategy: This project is categorized as Non-ACAT (Non Acquisition). The project delivers a broad spectrum of products that require a variety of acquisition processes to implement. Equipment products for Naval stations and other mission funded activities costing over 100K are often procured centrally through the Navy Pollution Prevention Equipment Program (PPEP) where as equipment products for Shipyards and other Navy Working Capital Fund (NWCF) activities costing over 100K are procured through their Capital Purchases Program (CPP). For both types of activities, (U) Acquisition Strategy: This project is categorized as Non-ACAT (Non Acquisition). The project delivers a broad spectrum of products that require a variety of acquisition processes to implement. state, and local regulators; 4) Other stakeholders with cognizance over the Navy process or operation being changed, and 5) The private or government organization that will produce the product.

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 18 of 21)

CLASSIFICATION:

DATE: February 2000	NUMBER	1817			Cont Ship Intermediate Maint Activity (SIMA) Rqmts under NELP	Cont Exhaust Scrubber for Static Testing of Small Rocket Motors Cont Confined Burn Facil to Replace Open Burning of Ordn & Energetics	Comp In-Line Monitoring & Diversion of Problem Contam in Discharges Cont New Rqmts from Navy EQ RDT&E Strat Plan Update	Comp Env Sound Fre Fighting Training Fadi Comp Reduced False Positive from Marine Sediment Bioassays Comp Methods to Assess Subsurface Contan Migration from Coastal Landfills Cont New Rqumts from Navy EQ RDT&E Strat Plan Update	Comp Shoreside Collection & Treatment Sys for Comp Fuel Tank Baltast Water Comp Total Toxic Organic Reduction for Nayl Indust Waste Treatment Plants Cont Vol & Contam Reduct in Wastewater Discharged to Navy IWTPs & POWTs
	IAME AND	atement /Y(FY01	Cont Ship In	Cont Exhaus Cont Confine	Comp In-Lin Cont New R	Comp Env S Comp Redu Comp Metro Cont New R	Comp Shore Comp Total Cont Vol & G
EXHIBIT R-2a, RDT&E Project Justification	PROGRAM ELEMENT NAME AND NUMBER PROJECT NAME AND NUMBER	Environmental Protection / PE0603721N Pollution Abatement /Y0817		FY00	Comp Automated Painting Appl w/ Overspray Capture & Treatment Comp Air Emission Reduction from Shayd Cutting & Arc-Gouging Operations Int Ship Intermediate Maint Activity (SIMA) Remits under NELP	Cont Exhaust Scrubber for Static Testing of Small Rocket Motors Cont Confined Bum Facil to Replace Open Burning of Ordn & Energetics	Comp Jet Engine Test Cell Emissions Reduction Cont In-Line Monitoring & Diversion of Problem Contam in Discharges Init New Ramis from Navy EQ RDT&E Strat Plan Update	Comp Sound Propagation Over Water Mod Corrections for Navy-Unique Scenarios Comp OwikSet Marine Sediment Bloassays using Bioluminescent Cindlagellates Comp Subsurface Contam Transport & DNAPL Sensor System Comp Integ Field Screening for Fapid Sediment Contam Characterization comp Pler-Side oil Spit Detection System Cont Environmentally Sound File Fighting Training Fadi Cont Environmentally Sound File Fighting Training Fadi Cont Reduced False Positive from Marine Sediment Bloassays Cont Methods to Assess Subsurface Contam Migration from Coastal Landfills Inti New Reprits from Navy EQ ROTRE Strat Plan Update	Comp Options for Recyc Regs Contam w/ RCRA Wastes Comp Trans Cyanide Wastewater Treatment Tech from Navy Expl Dev Prog Comp Trans Collection & Treatment Sys for Comp Fuel Tank Ballast Water Cont Total Toxic Organic Reduction for Navy Industrial Waste Treatment Plants Init Vol & Contam Reduction in Wastewater Discharged to Navy IWTPs & POWTs
	APPROPRIATION/BUDGET ACTIVITY PI	RDT&E, BA4	D. (U.) Schedule Profie:	FY99	Ship Maintenance/Repair/Deactivation Comp Recyc of Bige Derusting & Pacification Chemicals Comp Recyc of Shyd HW using Catalytic Extraction Process Comp Hexavehard Cf Errission Reduction from Shyd Welding Operations Cont Automated Paint Application w Overspray Capture & Treatment Cont Air Emission Reduction from Shyd Cutting & Arc-Gouging Operations	Ordinance Testing/Manufacture/Disposal Cont Exhaust Scrubber for Static Testing of Small Rocket Motors Cont Control Bun Facil to Replace Open Buming of Oxfur & Energetics Cont Dav of Marine Sediment Toxicity Data for Oxfur Compounds Comp Eval of Electrochem Oxid Options for Destr of Waste Energetic Mat'ls	Other Industrial Operations Comp Leak Detection Sys for Large Underground Bulk Fuel Storage Tanks Cont. Jet Engine Test Cell Emissions Reduction Init In-Line Monitoring & Diversion of Problem Contam in Discharges	Non-Industrial Operations Comp Controlling Mon-Parit Source Discharges using Constructed Wetlands Comp Controlling Mon-Parit Source Discharges using DNA Integrity Comp SNA-Letteral Biochemical Toxicity Analysis using DNA Integrity Comp In-Situ Remediation of Contam using Fenton's Reagent Comp Source Money Contam Reagent Cont Subsurface Contam Transport & DNAPL Sensor Sys Cont Integ Field Screening for Rapid Sediment Contam Characterization Cont Red Sold to Spill Detection Sys Cont Environmentally Sound Fire Fighting Training Taraining Teach Cont Reduced False Positive from Maine Sediment Blosssays Init Methods to Assess Subsurface Contam Migration from Coastal Landfills	Hazardous Waste Minimization/Recycling/Disposal Comp Eval of Waste Paint Disposal & Recyc Alternatives Comp Eval of Waste Paint Disposal & Recyc Alternatives Conf Trans Cyanide Wastewater Treatment Tech from Navy Expl Dev Prog Comp Pasma Acro Waste Treatment Tech Comp Contam Sediment Vol Minimizion using Particle Separation Comp Contam Sediment Vol Minimizion using Particle Separation Comp Eval of Waste Paint Disposal & Recyc Alternatives init Shoreside Collection & Treatment Sys for Comp Eval Toxic Organic Reduction for Navy Indust Waste Treatment Plants init Total Toxic Organic Reduction for Navy Indust Waste Treatment Plants

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 19 of 21)

CLASSIFICATION:

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			لين	EXHIBIT R-	3, Cost Ana	EXHIBIT R-3, Cost Analysis (page 1)	1)		DATE:				
									:		February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	/ITY	-	PROGRAM ELEMENT	EMENT			PROJECT N	PROJECT NAME AND NUMBER	MBER				
RDT&E, BA4		<u>ш</u>	Environmental Protec	ntal Protec	tion / PE0603721N	03721N	Pollution Aba	Pollution Abatement / Y0817	7				
Cost Categories	Contract	Contract Performing		Total		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Method Activity &		PΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	& Type Location		Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Ship Maintenance/Repair/Deact	WRVPO	WR/PO NSWC/CD		4.745	1.815	varies	1.955	varies	1.850	varies	Cont	Cont	N/A
Ship Maintenance/Repair/Deact	WR/PO	WR/PO NFESC		3.428	0.452	varies	0.480	varies	0.450	varies	Cont	Cont	N/A
Ordnance Testing/Manufact/Disp	WR/PO	WR/PO NSWC/IH		8.299	2.393	varies	1.930	varies	1.840	varies	Cont	Cont	N/A
Other Industrial Operations	WR/PO	WR/PO NFESC		10.429	1.170	varies	1.500	varies	1.400	varies	Cont	Cont	N/A
Other Industrial Operations	WR/PO	WR/PO SSC/SD		5.824	0.487	varies	0.640	varies	0.625	varies	Cont	Cont	N/A
Non-Industrial Operations	WR/PO	WR/PO SSC/SD		10.168	0.807	varies	1.165	varies	1.130	varies	Cont	Cont	N/A
Non-Industrial Operations	WR/PO	WR/PO NFESC		5.203	0.537	varies	0.770	varies	0.715	varies	Cont	Cont	N/A
Haz Waste Min/Recycle/Disp	WR/PO	NFESC		5.817	0.748	varies	0.690	varies	0.625	varies	Cont	Cont	A/A
Haz Waste Min/Recycle/Disp	WR/PO NRL	NRL		1.789	0.179	varies	0.176	varies	0.182	varies	Cont	Cont	ΑN
Subtotal Product Development				55.702	8.588		9.306		8.817	•			

Performing Activities: Naval Surface Warfare Center, Carderock Division (NSWC/CD), Naval Facilities Engineering Service Center (NFESC), Naval Surface Warfare Center, Indian Head Division (NSWC/IH), Space and Warfare Systems Center, San Diego (SSC/SC), Naval Research Laboratory (NRL).

Total Prior Years Cost: Summation starts with FY80. Subtotal does not include performing activities from prior years that are no longer performing activities.

Award Dates: About 55% of the project is executed via contracts awarded by the performing activities.

Software Development					*		0.000	
Training Development							0.000	
Integrated Logistics Support							0.000	
Configuration Management							0.000	
Technical Data							0.000	
GFE							0.000	
Subtotal Support		0.000	0.000	0.000	0.000	0.000	0.000	

Remarks: Included in Product Development costs.

R-1 - Item No. 62-20 of 62-21

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 20 of 21)

CLASSIFICATION:

				EXHIBIT R.	3, Cost Anal	R-3, Cost Analysis (page 2)	≈		DATE:				
						:					February 2000	000	
APPROPRIATION/BUDGET ACTIVITY	/IT/		PROGRAM ELEMENT	LEMENT			PROJECT NA	PROJECT NAME AND NUMBER	ABER	:			
RDT&E, N			Environmental Prof	ntal Protect	lection / PE0603721N	03721N	Pollution Aba	Pollution Abatement / Y0817	2				
Cost Categories	Contract	Contract Performing		Total		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Activity &		PYs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type Location	Location			Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Developmental Test & Evaluation													
Operational Test & Evaluation													
Subtotal T&E				0.000	0.000		0.000		0.000		0:000		
Remarks: Included in Product Development costs.	evelopment o	costs.											
Contractor Engineering Support					:							0.000	
Government Engineering Support												0.000	
Program Management Support												0.000	
Travel												0.000	
Labor (Research Personnel)												0.000	
Overhead			4									0.000	
Subtotal Management				0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: Not applicable.													
Total Cost				55.702	8.588		9.306		8.817		Cont	Cont	Cont
Remarks:													

R-1 - Item No. 62-21 of 62-21

UNCLASSIFIED

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 21 of 21)

FY 2001 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: FEBRUARY 2000

UDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N

PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

U) COST: (Dollars in Thousands)

TOTAL PROGRAM	CONT.		CONT.	1,989	CONT.
TO	CONT.		CONT.	1,989	CONT.
FY 2005 ESTIMATE	3,027		2,355	ı	5,382
FY 2004 ESTIMATE	2,942		2,289		5,231
FY 2003 ESTIMATE	2,887		2,246	ı	5,133
FY 2002 ESTIMATE	2,871		2,219	ı	2,090
FY 2001 ESTIMATE	2,757		2,185	1	4,942
FY 2000 ESTIMATE	(ADV) 2,783		2,173	1,989	6,945
FY 1999 ACTUAL	Energy Conservation (ADV)	Mobility Fuels (ADV)	2,060 Dehumidification Demo	1	4,518
ROJECT UMBER & ITLE	0829	0838	2766		OTAL

pecification fuels when military specification fuels are unavailable or in short supply; and (f) make needed periodic changes s range and time on station; (b) reduce energy costs; (c) reduce dependence on petroleum fuels and apply energy technologies hat improve environmental compliance; (d) relax unnecessarily restrictive fuel specification requirements to reduce cost and ncrease availability worldwide; (e) provide guidance to fleet operators for the safe use of commercial grade or off-. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program supports projects to evaluate, adapt, and demonstrate (a) increase fuel-related weapons systems capabilities such o fuel specifications to ensure fuel quality and avoid fleet operating problems. As presently funded and planned the Navy hip and Aircraft Energy Conservation Research and Development Program, of which Project R0829 is a part, is estimated to nergy related technologies for ship and aircraft operations to:

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R -1 Line Item 63

Budget Item Justification (Exhibit R-2, page 1 of 12)

FY 2001 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: FEBRUARY 2000

UDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603724N

PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

esult in energy cost avoidance of \$70M/yr by FY2005. Project R2766 is an FY2000 Congressional plus-up to demonstrate essicant dehumidification in Naval Facilities.

- U) This program, and the companion PE 0604710N, Navy Energy Program support the achievement of legislated, White House, Department of Defense and Navy Energy Management Goals. It also responds to direction from the Office of the Secretary of the Navy and the Chief of Naval Operations to make up-front investment in technologies that reduce future cost of operation and ownership of the fleet and supporting infrastructure.
- JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications. b
- PROGRAM CHANGE SUMMARY FOR TOTAL PE:

FY2001 4,962	-20	4,942
FY 2000 4,984 6,984		-39 2000 6,945
FY 1999 4,571	-31	4,518
(U) FY 2000 President's Budget:(U) Appropriated Value:(U) Adjustments from PRESBUDG:	(U) SBIR/STTR Adjustment (U) Various Rate Adjustment (II) Execution Pate Adjustment	(U) Congressional Rescissions (U) Congressional Plus-Up (R2766) (U) FY 2001 PRESBUDG Submission

- (U) CHANGE SUMMARY EXPLANATION:
- (U) Schedule: Not applicable.

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R -1 Line Item 63

Budget Item Justification (Exhibit R-2, page 2 of 12)

FY 2001 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: FEBRUARY 2000

4 UDGET ACTIVITY:

PROGRAM ELEMENT: 0603724N PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

(U) Technical: Not applicable.

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R -1 Line Item 63

Budget Item Justification (Exhibit R-2, page 3 of 12)

FY 2001 RDT&E, N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

FEBRUARY 2000

DATE:

UDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603724N

PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

U) COST: (Dollars in Thousands)

TOTAL	CONT.
TO	CONT.
FY 2005 ESTIMATE	3,027
FY 2004 ESTIMATE	2,942
FY 2003 ESTIMATE	2,887
FY 2002 ESTIMATE	2,871
FY 2001 ESTIMATE	2,757
FY 2000 ESTIMATE	2,783
FY 1999 ACTUAL	Energy Conservation 2,458
ROJECT UMBER & ITLE	0829

Major efforts This project improves the energy efficiency of Navy ships and nclude work to increase the efficiency of aircraft engines; and develop improved hull drag reducing technologies and more ircraft, and thereby contributes to reduced operating costs and improved fleet sustainability and performance. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: fficient energy conversion systems for ships.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1999 ACCOMPLISHMENTS:

- (U) (\$916) Aircraft: Continued cooperative effort with General Electric (GE) for detailed design of an advanced High Pressure Turbine (HPT) to meet F414 (the F/A-18E/F engine) growth requirements. Directed F-414 F/A-18E/F simulator set up to support testing of an advanced engine "Performance Seeking Control" (PSC) system to ensure flight worthiness. Monitored conceptual design of an advanced fan for F414 engine (a joint F414 program office and GE program) to ensure efficiency consideration.
 - (U) (\$1,542) Ships: Model tested bow bulb and stern/propeller hydrodynamic enhancements for TAO-187 class to determine drag reduction. Completed detailed design and drawings for Guided Missile Destroyer (DDG-51) retrofit stern flap applicable to first 28 ships. Completed LHA/LHD stern flap model tests. Continued laboratory to bilgekeel panel tests of emerging Anti-Fouling coatings: self-polishing reduced copper/cobiocide paints in particular.

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R -1 Line Item 63

Budget Item Justification (Exhibit R-2, page 4 of 12)

FY 2001 RDI&E, N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: FEBRUARY 2000

4 UDGET ACTIVITY:

PROGRAM ELEMENT: 0603724N PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

Continued development of variable geometry diffusor technology to improve efficiency of air conditioning plants using non Chloro-flouro-carbon (CFC) refrigerants; for both forward and backfit.

UNCLASSIFIED R -1 Line Item 63

Budget Item Justification (Exhibit R-2, page 5 of 12)

FY 2001 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

UDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603724N PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

PROJECT: R0829

PROJECT TITLE: Energy Conservation

FEBRUARY 2000

DATE:

2. (U) FY 2000 PLAN:

- (\$1,050) Aircraft: Flight test PSC advanced engine control logic on F/A-18E/F. Develop advanced components to meet F414 growth requirements: HPT, advanced fan, compressor, low- pressure turbine, and advanced full authority digital engine control with PSC. These are joint efforts with the Navy F414 program office and GE. Energy program participation incentivizes these efforts and ensures that efficiency, as well as performance gains are pursued.
- (U) (\$1,733) Ships: Begin assessment of hydrodynamic refinements for Landing Ship Dock (LSD) 41/49 classes. Evaluate self-polishing reduced copper/cobiocide paints for energy savings and environmental impact. Support design of optimized air-conditioning plants for both retrofit and forward fit. Begin development of on-line water-wash system for gas turbines. Optimize tool designs for hull inspection remotely operated vehicle for fouling assessment and spot cleaning.

3. (U) FY 2001 PLAN:

- compressor and low pressure turbine). These efforts are jointly funded with the Navy F414 Program Office, and GE, and in some cases transition new technology from the Integrated High Performance Turbine Engine Technology Program. Components will be tested via the next GE-23a demonstrator engine build. Energy R&D participation incentivizes efficiency improvements. Begin evaluation of new, fuel efficient, component technology options for application to (\$1,050) Aircraft: Continue participation in development of advanced F414 engine components: (advanced fan, future F404 variants (F/A-18C/D engine).
 - optimized air-conditioning plants for both retrofit and forward fit. Continue development of on-line water-wash copper/cobiocide paints. Screen candidate paints by rates of copper release and binder hydrolysis --best paints will undergo large scale testing in PE 0604710N to demonstrate suitability for Navy use. Support design of Continue screening and model testing of simple hydrodynamic mods for future ships to (\$1,707) Ships: Evaluate effectiveness and maintenance requirements of self-polishing reduced improve energy efficiency. system for gas turbines.
- (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

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R -1 Line Item 63

Budget Item Justification (Exhibit R-2, page 6 of 12)

FY 2001 RDI&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

PROGRAM ELEMENT: 0603724N

UDGET ACTIVITY:

Energy Conservation PROJECT: R0829 PROJECT TITLE: PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

FEBRUARY 2000

DATE:

(U) RELATED RDT&E:

(Defense Research Sciences) PE 0601153N 66666666

(Surface Ship Technology) 0602121N

(Aircraft Technology) 0602122N

(Materials, Electronics and Computer Technology) 0602234N PE

0603217N

(Air Systems and Weapons Advanced Technology)
(Environmental Quality and Logistics Advanced Technology)
(Environmental Protection) PE 0603712N PE 0603721N PE 0604710N

(Navy Energy Program (ENG))

(U) SCHEDULE PROFILE: Not applicable.

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R -1 Line Item 63

(Exhibit R-2, page 7 of 12) Budget Item Justification

FY 2001 RDI&E, N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROGRAM ELEMENT: 0603724N 4 UDGET ACTIVITY:

PROJECT: R0829 PROJECT TITLE: Energy Conservation

DATE: FEBRUARY 2000

(U) PROJECT COST BREAKDOWN: (\$ in thousands)

FY2001 2,757 FY 2000 2,783 FY 1999 2,458 . System Development and Integration roject Cost Categories

(U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable.

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PE/Project Cost Breakdown (Exhibit R-3, page 8 of 12)

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

FEBRUARY 2000

DATE:

UDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603724N PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

U) COST: (Dollars in thousands)

TOTAL	CONT.
TO COMPLETE	CONT.
FY 2005 ESTIMATE	2,355
FY 2004 ESTIMATE	2,289
FY 2003 ESTIMATE	2,246
FY 2002 ESTIMATE	2,219
FY 2001 ESTIMATE	2,185
FY 2000 ESTIMATE	2,173
FY 1999 ACTUAL	Mobility Fuels (ADV)
ROJECT UMBER & ITLE	0838

ustomer for fuels that cost over \$2B per year to procure, transport, store and consume and are essential to fleet operations. pecification fuels are unavailable or in short supply; and (c) make needed periodic changes to fuel specifications to ensure Recent egradation of fuel in storage. The resulting readiness impacts, additional maintenance costs, and the cost of lost quipment, although difficult to quantify, are many times the cost of this project. Over the next decade, the potential for uel quality related problems will increase because of changing industry practices required to comply with new environmental egulations. This project represents the only investment designed to maintain the Navy's ability to operate as a "smart" hich relate the effects of changes in Navy fuel procurement specification properties to the performance and reliability of A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides data through engine and fuel system tests roblems with fuel quality have adversely affected ship and aircraft system performance and reliability and resulted in (a) determine the extent to which Lel quality and avoid fleet operating problems while accommodating evolutionary changes in the fuel supply industry. b) provide guidance to fleet operators for the safe use of off-specification or commercial grade fuels when military nnecessarily restrictive specification features can be relaxed to reduce cost and increase availability worldwide; aval ship and aircraft engines and fuel systems. This information is required to:

R-1 Line Item 63

Budget Item Justification (Exhibit R-2, page 9 of 12)

FY 2001 RDT&E, N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

FEBRUARY 2000

DATE:

Mobility Fuels (ADV) PROJECT NUMBER: PROJECT TITLE: PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROGRAM ELEMENT: 0603724N

U) PROGRAM ACCOMPLISHMENTS AND PLANS:

UDGET ACTIVITY:

1. (U) FY 1999 ACCOMPLISHMENTS:

- specification (MILSPEC) ship diesel fuels. Initiated work to determine effects of low lubricity ship diesel fuels on Conducted bench scale the durability of Navy gas turbine engine and high-speed diesel engine fuel handling systems. Conducted bench scale tests to determine the effects of red-dyed marine distillate fuels on Navy gas turbine engine hot section materials. Completed experimental work to determine lubricity characteristics of low sulfur Navy military Completed study to forecast marine distillate fuel and Navy engine characteristics through 2010. (\$910) Ships:
- aircraft fuel thermal stability enhancing additive containing fuels. Completed evaluation of effect of +100 additives on P-3 and C-130 engines. Initiated evaluation of effects of +100 additives on F/A-18 engine systems. (U) (\$1,150) Aircraft: Completed test & evaluation (T&E) of prototype fuel/water separator elements for +100 Completed test and evaluation of non-toxic, environmentally benign fuel system icing inhibitors.

2. (U) FY 2000 PROGRAM:

- effects of low thermal stability Navy distillate fuels on maintenance requirements for navy gas turbine and diesel engines. Initiate work to determine the feasibility of specifying a single fuel for use by all Naval systems (ships, fuels to determine effects on durability and initiate full-scale fuel handling system tests. Initiate evaluation of Continue gas turbine and diesel engine component tests with low lubricity MILSPEC ship diesel lubricity enhancing additives for use with low lubricity MILSPEC ship diesel fuels. Initiate work to quantify aircraft, and ground equipment). (\$970) Ships:
- Complete development of (U) (\$1,203) Aircraft: Initiate shipboard evaluation of prototype fuel/water separator elements for +100 additive containing fuels. Complete evaluation of effects of +100 additives on F/A-18C/D and T-45 engine systems. Complete detailed cost benefit analysis for Naval use of +100 additives. Complete F/A-18E/F engine component tests to determine effects of copper contaminated Navy jet fuels on engine maintenance requirements. a prototype copper contamination removal system for fuels.

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Budget Item Justification (Exhibit R-2, page 10 of 12)

FY 2001 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

PROJECT NUMBER:

FEBRUARY 2000

DATE:

PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROGRAM ELEMENT: 0603724N

4

UDGET ACTIVITY:

Mobility Fuels (ADV) PROJECT TITLE:

3. (U) FY 2001 PLAN:

(U) (\$990) Ships: Complete testing of full scale Navy gas turbine and diesel engine fuel handling systems with low lubricity fuels. Use results to specify minimum lubricity levels and test method to be used for fuel acceptance. Complete evaluation of lubricity enhancing additives for use with Navy distillate fuels. Complete component tests to determine effects of low thermal stability Navy distillate fuels on maintenance requirements for Navy gas turbine and diesel engines, and initiate tests on full scale fuel handling systems. Complete assessment of the turbine and diesel engines, and initiate tests on full scale fuel handling systems. feasibility of specifying the use of a single fuel for all Naval Systems.

fuels. Initiate Joint Strike Fighter engine component tests to determine effects of copper contaminated jet fuel (U) (\$1,195) Aircraft: Complete evaluation of the effects of +100 additives on F/A-18E/F and AV-8B engine systems. Complete shipboard evaluation of prototype fuel/water separator elements for +100 additive containing Conduct field tests of prototype copper contamination removal system for on engine maintenance requirements.

- OTHER PROGRAM FUNDING SUMMARY: Not applicable. e
- RELATED RDT&E: Ð
- (In-House Laboratory Independent Research)
- (U) PE 0601152N (In-House Laboratory Independent Research)(U) PE 0602234N (Materials, Electronics and Computer Technology)
- SCHEDULE PROFILE: Not applicable. e)

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Budget Item Justification (Exhibit R-2, page 11 of 12)

FY 2001 RDT&E, N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: FEBRUARY 2000

PROGRAM ELEMENT: 0603724N PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

Mobility Fuels (ADV) R0838 PROJECT NUMBER: PROJECT TITLE:

UDGET ACTIVITY:

(U) PROJECT COST BREAKDOWN: (\$ in thousands)

FY2001

2,185

. Reliability, Maintainability, and Availability

roject Cost Categories

FY 2000 2,173 FY 1999 2,060

(U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable.

R-1 Line Item 63

Budget Item Justification (Exhibit R-2, page 12 of 12)

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EXHIBIT R-2, RDT&E Budget Item JustificationSheet	RDT&E Bud	get Item Jus	stificationSh	reet			DATE:	February 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E. BA4	PROGRAM ELEMENT NAME AND NUMBER Facilities Improvement / PE0603725N	PROGRAM ELEMENT NAME AND NUMBER Facilities Improvement / PE06037251	ME AND NUI		PROJECT N Navy Facilitie	PROJECT NAME AND NUMBER Navy Facilities System/Y0995	IMBER 995		
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 1999 FY 2000 FY 2001 FY 2002 FY 2003 FY 2004 FY 2005 Cost to Complete Total Cost	Total Cost
Total PE Cost	1.834	1.974	1.824	1.719	1.759	1.811	1.864		
Navy Facilities System/Y0995	1.834	1.974	1.824	1.719	1.759	1.811	1.864	Cont	Cont
RDT&E Articles Otv	5	2	9	TBD	TBD	TBD	TBD	¥.	N A

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program provides the Navy with new civil engineering capabilities that are required to overcome specific performance limitations of Naval shore facilities while reducing the cost of sustaining the Naval shore infrastructure. The program focuses available resources on satisfying facility requirements where the Navy is a major stakeholder. There are no test validated Commercial off the Shelf (COTS) solutions available, and a timely solution will not emerge without a Navy sponsored demonstration and validation. The program completes the development and validation of facility technologies originating in Navy Science and Technology programs, plus a variety of other sources which includes the National Science Foundation (NSF) and the National Institute of Standards and Technology (NIST). Validated technologies are implemented in the Navy's Military Construction (MILCON) and Real Property Maintenance (RPM) Programs. Project Y0995 is addressing four Navy facility requirements during the fiscal years FY 1999 through FY2001: The High Performance (HP) Magazine, Waterfront Facilities Repair and Upgrade, Facilities Technologies to Reduce the Real Property Maintenance (RPM) Backlog, and the Modular Hybrid Pier. The execution of this program is consistent with the findings and recommendation of two National Academy of Sciences Reports: "The Role of Federal Agencies in Fostering New Technology and Innovation in Building" and "Federal Policies to Foster Innovation and Improvement in Constructed Facilities."

_	"	O. #
FY 2001	1.916	-0.092 1.824
FY 2000	1.985 1.985	-0.011 1.974
FY 1999	1.853 1.853	-0.019 1.834
B. (U) PROGRAM CHANGE SUMMARY:	(U) FY 2000 President's Budget: (U) Appropriated Value:	(U) Adjustments from Pres Budget: (U) FY 2001 President's Budget Submit:

CHANGE SUMMARY EXPLANATION

- (U) Funding: Reflects a combination of general decreases including SBIR transfers (FY99), Across-the-Board Reduction (FY00), and NWCF rate adjustments (FY01). (U) Schedule: One year delay in completion of one Real Property Maintenance (RPM) technology validation (LV) and year delay in completion of one Real Property Maintenance (RPM) technology validation (LV).

C. (U) OTHER PROGRAM FUNDING SUMMARY: Provided in Project Y0995 R-2a

D. (U) ACQUISITION STRATEGY: Provided in Project Y0995 R-2a

E. (U) SCHEDULE PROFILE: Provided in Project Y0995 R-2a

R-1 - Item No. 64

Exhibit R-2, RDT&E Budget Item Justification Sheet (Exhibit R-2a, page 1 of 8)

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EXHIBIT R-2a,	R-2a, RDT&E Project Justification	ect Justific	ation			DATE:	Feb	February 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E, BA4	PROGRAM E Facilities I	LEMENT NA mproveme	PROGRAM ELEMENT NAME AND NUMBER Facilities Improvement / PE0603725N	4BER 3725N					
COST (\$ in Millions)	FY 1999	FY 2000	FY 2000 FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete	Total Cost
Navy Facilities System/Y0995	1.834	1.974	1.824	1.719	1.759	1.811	1.864	Cont	Cont
RDT&E Articles Qty	5	5	9	TBD	TBD	TBD	TBD	NA AN	Ą

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program provides the Navy with new civil engineering capabilities that are required to overcome Validated technologies are implemented in the Navy's Military Construction (MILCON) and Real Property Maintenance (RPM) Programs. This project is addressing four Navy specific performance limitations of Naval shore facilities while reducing the cost of sustaining the Naval shore infrastruture. The program focuses available resources on satisfying facility requirements where the Navy is a major stakeholder. There are no test validated Commercial off the Shelf (COTS) solutions available, and a timely solution will not emerge without a Navy sponsored demonstration and validation. The program completes the development and validation of facility technologies originating in Navy Science and Technology programs, plus a variety of other sources which includes the National Science Foundation (NSF) and the National Institute of Standards and Technology (NIST). acility requirements during the fiscal years FY 1999 through FY2001:

(U) THE HIGH PERFORMANCE (HP) MAGAZINE.

pounds/acre to 2,222 pounds/acre. In addition, the number of incompatible classes of ordnance that can be stored in the same magazine is incased from none to eight. This will lead to lower operational costs for the Receipt, Segregation, Storage, and Issue (RSSI) of ordnance and, for some activities, a reduction in the number of magazines required to (U) Based on current magazine technologies, substantial land areas within Naval activities cannot be used for inhabited buildings in order to satisfy Explosives Safety Quantify Distance (ESQD) arcs. The converse is also true, the Navy is not able to construct new magazines where they are needed because of the presence of inhabited buildings. This and the innovative use of energy absorbing construction materials to provide the Navy with a new magazine concept. The new magazine will have smaller ESQD arcs that are based on a Maximum Credible Event (MCE) that is not the detonation of the entire magazine but rather the detonation of the contents of one, much smaller, storage cell within the magazine. For a typical magazines with Net Explosive Weight (NEW) capabilities of 250,000 pounds, the allowable ordnance storage density is increased from 370 effort enables a quantification of the specific hazard scenarios capable of causing ordnance detonation, an improved capability to model an ordnance explosion in a magazine, accomplish their mission.

(U) WATERFRONT FACILITIES REPAIR AND UPGRADE.

(U) Over 75% of the Navy's waterfront facilities are over 45 years old. They were designed for a service life of no more that 25 years and to satisfy the mission requirements that have concentrated outrigger loads of up to 120 tons on a pier originally designed for no concentrated deck loading. This effort integrates new methods to extend the service existing at that time of construction. The reinforced concrete used to construct nearly all of them requires costly and repetitive repairs. In addition, they are unable to satisfy new mission requirements, such as the increase in pier deck capacity required to accomplish more extensive pier-side ship maintenance and repair tasks using truck-mounted cranes life of existing waterfront facilities by an additional 15 to 30 years, and to cost effectively upgrade them to satisfy new mission requirements. Specific benefits include increasing the durability of spalled marine concrete repairs from 3 to 15 years, new longer-lasting low-maintenance fendering systems that eliminate the need for the frequent replacement of timber piles, a new impulse Load Method of assessing the vertical load capacity of pile-supported waterfront structures, and providing new pier upgrade alternatives costing about \$5M for a typical pier instead of the now required demolish then replace approach costing about \$30M.

R-1 - Item No. 64

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 2 of 8)

UNCLASSIFIED

DATE: February 2000	
a	PROJECT NAME AND NUMBER Navy Facilities System/70995
EXHIBIT R-2a, RDT&E Project Justification	PROGRAM ELEMENT NAME AND NUMBER Facilities Improvement / PE0603725N
EXH	APPROPRIATION/BUDGET ACTIVITY RDT&E, BA4

(U) FACILITY TECHNOLOGIES TO REDUCE THE REAL PROPERTY MAINTENANCE (RPM) BACKLOG.

Current Navy RPM funding levels are insufficient to prevent the continued growth of the critical backlog of maintenance and repairs. This effort will validate and accelerate the wide-spread implementation of a broad range of advanced facility technologies needed to overcome design and construction practices that are conservative and remain costly because of the high risk the private sector associates with the utilization of new facility technologies. The effort will accelerate the (U) The Real Property Maintenance (RPM) costs to correct critical facility deficiencies are over \$2.08 as reported in the FY 1995 Annual Inspection Summary (AIS). validation, commercialization, and wide-spread implementation of the facility technologies urgently required to reduce the cost of deficiencies in the Navy's RPM backlog by reducing initial construction costs up to 20% and facility components with service lives that are up to 25 years longer.

(U) MODULAR HYBRID PIER.

enable off-site fabrication that will shorten the duration and lower the cost of the on-site construction. Modular design will also facilitate change-out of components to repair damage or to modify structure geometry or capacity to adapt to future changes in ship designs. An economic analysis has shown that a modular hybrid pier will develops and validates technologies for a mission flexible waterfront infrastructure characterized by significantly reduced life cycle costs. The concepts validated by this project's Waterfront Facilities Repair and Upgrade thrust will enable the Navy to economically extend the useful service life of many existing piers and wharves. They will reduce the Navy's need to construct new piers and wharves, but will not eliminate the need completely. Emerging innovative materials technologies, particularly those that will transition from the Navy's Exploratory Development (6.2) Research Program, can provide a new capability to design replacement structures that have a weight concrete for structural elements will produce structures that have twice the structural service life of the structures that they will replace. Modular design will The Navy is faced with the necessity of recapitalizing a large portion of its waterfront infrastructure over the next several decades. The Modular Hybrid Pier thrust comparable initial cost yet have far less maintenance and repair cost. Use of fiber-reinforced plastics (FRP) for appurtenances and FRP-reinforced high strength lighthave a Net Present Value (NPV) cost that is \$8M less over its service life than that for a conventional structure constructed on steel-reinforced concrete.

1. (U) FY 1999 ACCOMPLISHMENTS:

(U) (\$0.220M) The High performance (HP) Magazine - Completed standard design of magazine, documentation of operation procedures, and other documentation required to obtain Department of Defense Explosives Safety Board (DDESB) certification.

(U) (\$0.660M) Waterfront Repair and Upgrade - Installed and tested two composite submarine camels and backing fender piles (one complete submarine berth) at SUBASE New London. Collected load and energy dissipation performance data. Conducted field test of blocking, whale and camel replacement components comprised of composite wood products. Completed performance specifications for composite fender piling and composite camel systems. Initiated design for upgrade of a pier or wharf using composite structural systems. Validated performance of the falling weight deflectometer (FWD) on a Navy pier having a deck thickness greater

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 3 of 8)

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EXHI	EXHIBIT R-2a, RDT&E Project Justification	DATE:	
		L .	February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, BA4	Facilities Improvement / PE0603725N	Navy Facilities System/Y0995	

(U) (\$0.954M) Real Property Maintenance (RPM) Backlog Reduction - Initiated large scale field tests to validate performance of selected facility technologies within the general areas of high performance concrete, roofing, coatings and corrosion protection, and composite materials. Continued FY 1999 testing coordination with the Civil Engineering Research Foundation (CERF), and with participating Navy activities. Began technology selection and validation test planning for the FY 2000 tests.

2. (U) FY 2000 PLAN:

Complete design and award contract from corrosion stabilization, concrete repair and strengthening with composites of a selected Navy pier. Install instrumentation to monitor long term corrosion (U) (\$0.748M) Waterfront Repair and Upgrade - Complete testing for advanced pile and camel systems using composite materials. state and structural performance. (U) (\$1.226M) Real Property Maintenance (RPM) Backlog Reduction - Continue technology validation tests initiated in FY 1999. Initiate additional tests planned during FY 1999. National performance standards will be used to evaluate resulting test data when they are applicable. When none exist, the resulting test data will be submitted to the National Evaluation Service - Building Innovation Center (NES-BIC) of CERF for independent technical evaluation. Begin technology selection and validation test planning for FY 2001 tests.

3. (U) FY 2001 PLAN:

(U) (\$0.250M) Waterfront Repair and Upgrade - Complete initial testing for corrosion stabilization, concrete repair and strengthening with composites. Develop documentation for implementation of new repair and upgrade concepts by both NAVFAC field activities and private-sector contractors. Concepts will be applicable to both repair and upgrade and for both vertical and lateral strengthening. (U) (\$1.299M) Real Property Maintenance (RPM) Backlog Reduction - Continue testing of high temperature airfield pavement, roofing management system, hangar floor coatings systems, moisture-cured urethane coating systems, and additional technologies identified in FY 2000. Begin technology selection and validation test planning for FY 2002 tests. (U) (\$0.275M) Modular Hybrid Pier - Conduct a constructability evaluation of components transitioning from related 6.2 Exploratory Development program. Complete design concept and begin test planning for the major assemblies.

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 4 of 8)

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EXHIBIT R-2a, RDT&E Project Justification	February 2000	TY PROGRAM ELEMENT NAME AND NUMBER PROJECT NAME AND NUMBER	Facilities Improvement / PE0603725N Navy Facilities System/Y0995	
EXHIBIT R-2a,		APPROPRIATION/BUDGET ACTIVITY PROGRA	RDT&E, BA4 Faciliti	

Programs: PE0602121N - Ship, Submarine and Logistics Technology, PE0602234N - Materials, Electronics and Computer Technology, and PE0603712N investment through partnerships with private sector organizations, such as the Civil Engineering Research Foundation (CERF) and the Composites Institute (CI) of The Society of the Plastics Industry (SPI). The project pursues opportunities to leverage Navy Real Property Maintenance (RPM) and Military Construction B. (U) OTHER PROGRAM FUNDING SUMMARY: This project transitions waterfront facility technologies from three Navy Exploratory Development (6.2) Research Environmental Quality and Logistics Advanced Technology Demonstrations. It also transitions facility technologies developed at universities under the sponsorship of the National Science Foundation (NSF), by the Building and Fire Research Laboratory (BRL) of the National Institute of Standards and Technology (NIST), and by the Constructed Engineering Reserach Laboratories (CERL) and Waterways Experiment Station (WES) of the U. S. Army Corps of Engineers (USACOE) when they can contribute to the solution of one of the Navy requirements being addressed by this project. The project pursures opportunities to leverage private sector (MILCON) investment through partnerships with RPM and MILCON program and project managers.

managers are then able to implement the technologies in their RPM and MILCON proejcts. Private sector capability to provide the new technology for use by the performance of the technology, 2) utilization of the technology in designs, 3) control of quality of the technology during constructions, 4) maintenance of the technology during operations, and 5) life-cycle costs of the technology is transitioned to Navy users by being included or referenced by the applicable Naval Facilities Engineering Command policy, guidance, and criteria. Navy Real Property Maintenance (RPM) and Military Construction (MILCON) program and project (U) ACQUISITION STRATEGY: This project is categorized as Non-ACAT (Non Acquisition). The information produced from this project for: 1) specifying the Navy is developed by including both individual contractors and industry organizations in development and testing of the technology.

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 5 of 8)

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PEROFECH AND NUMBER PEROFECET ACTIVITY PEROFECHAM ELEMENT NAME AND NUMBER PEROFECET MAME AND MUMBER PEROFECT MAME AND MUMBER PEROFECT MAME AND MUMBER PEROFECT MAME AND MUMBER PEROFECT MAME AND MUMBER PEROFECT	EXHIBI.	EXHIBIT R-2a, RDT&E Project Justification	DATE: February 2000	y 2000
FYON Complete pier and wharf capability upgrades using composites materials Composites materials Composites materials Composites materials Composites materials Composites materials Composites materials Composites materials Fight FYON FYON FYON FIGHING FYON FIGHING FYON FIGHING FYON FIGHING FYON FIGHING FYON FIGHING FYON FIGHING FYON FIGHING FYON FYON FIGHING FYON FYON FYON FIGHING FYON F	APPROPRIATION/BUDGET ACTIVITY RDT&E, BA4	PROGRAM ELEMENT NAME AND NUMBER Facilities Improvement / PE0603725N	PROJECT NAME AND NUMBER Navy Facilities System/Y0995	
FY00 Promance (HP) Meaazine te all documentation required for DDESB approval seign and operating concepts ont Facilities Repair and Upgrade. Ont Facilities Repair and Upgrade. Complete pire and whaf capability upgrades using Composites materials and camel systems using composites materials Composites materials Complete PY 1999 initiated technology validations Complete PY 1999 initiated technology validations This is a continue PY 2001 initiated technology validations	D. (U) SCHEDULE PROFILE:			
Complete pier and wharf capability upgrades using composites materials reparations materials Complete FY 1999 initiated technology validations Plan FY 2001 initiated technology validations Plan FY 2001 initiated technology validations	FY99 High Performance (HP) Magazine	FY00	FY01	
Complete pier and whaf capability upgrades using composites materials repa composites materials Complete FY 1999 initiated technology validations Continue FY 2000 initiated technology validations Plan FY 2001 initiated technology validations	Complete all documentation required for DDESB app of design and operating concepts	roval		
Complete pier and wharf capability upgrades using composites materials repa composites materials Complete FY 1999 initiated technology validations Continue FY 2000 initiated technology validations Plan FY 2001 initiated technology validations	Waterfront Facilities Repair and Upgrade.			
Composites materials Composites materials Complete FY 1999 initiated technology validations Plan FY 2001 initiated technology validations Plan FY 2001 initiated technology validations	Completed impulse load assessment methodology u Weight Deflectometer (FWD) Completed advanced fendering and camel systems u methodise	sing Falling Ising composite		
Complete FY 1999 initiated technology validations Continue FY 2000 initiated technology validations Plan FY 2001 initiated technology validations	110001010	Complete pier and wharf capability upgrades us composites materials	sing Complete corrosion stabilization, and concrete repair and strengthening	
Complete FY 1999 initiated technology validations Continue FY 2001 initiated technology validations Plan FY 2001 initiated technology validations	Real Property Maintenance (RPM) Backlog Reduc	ztion		
8 8	Begin four technology validations Plan FY2000 initiated technology validations	Complete FY 1999 initiated technology valid Continue FY 2000 initiated technology valid Plan FY 2001 initiated technology validatio	ations Complete FY2000 initiated technology validation Continue FY2001 initiated technology validation Plan FY 2002 initiated technology validations	lation ation ons
Complete desi technologie components components Continue valicie valicie desi	Modular Hybrid Pler			
			Complete design based on transitioned technologies and planning of testing of new components Continue validation testing of components	we

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 6 of 8)

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)	je 1)								DATE:	F	February 2000	8	
APPROPRIATION/BUDGET ACTIVITY	/ITY		PROGRAN	PROGRAM ELEMENT			PROJECT	PROJECT NAME AND NUMBER	NUMBER				
RDT&E, BA4			Facilities	s Improve	ment / PE	Facilities Improvement / PE0603725N	Navy Facil	Navy Facilities System/Y0995	9995/١/				
Cost Categories	Contract	Performing				FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Activity &		ΡΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to		Target Value
Requirements)	& Type	Location				Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
High Performance (HP) Magazine	ΧM	NFESC		3.478	82	10/98							-
		Pt. Hueneme, CA											,
	WR	NSWC		45	15	10/98							
		Indian Head, MD											
	WR	LANTDIV		334	100	12/98							
		Norfolk, VA											
	단	SVERDRUP		236	25	02/99							
		St. Louis, MO											
Waterfront Facilities Repair and	xw	NFESC		770	458	66/90	292	10/99	114	10/00			
Upgrade		Pt. Hueneme, CA											
	WR	NUWC		487	200	66/90				•			
		New London, CT											
	FP	Contractors TBD					452	04/00	120	05/01			
		Locations TBD											
Real Property Maintenance (RPM)	XM	NFESC		200	393	11/98	440	10/99	420	10/00	cont	cont	ē
Backlog Reduction		Pt. Hueneme, CA											
	FP	CERF		45	ଛ	12/98	20	10/99	22	12/00	cont	cont	<u> </u>
		Washington, DC											
	ᇿ	Contractors TBD			208	66/60	740	00/90	835	05/01	cont	cont	na
		Locations TBD											
Modular Hybrid Pier	××	NFESC							285	10/00	cont	cont	ā
		Pt. Hueneme, CA											
Subtotal Product Development				5.595	1.834		1.974		1.824				

Remarks:
Total Prior Years Cost: Summation starts with FY94. Subtotal does not include performing activities from prior years that are no longer performing activities.

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Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 7 of 8)

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APPROPRIATION/BI INGET ACTIVITY	TIVITY	CREI	PROGRAM FI FMFNT	IN:		PRO IFCT	NAME AND	PROJECT NAME AND NUMBER		TO MAIL & E		
RDT&E, N		Fac	ilities Impro	vement	Facilities Improvement / PE0603725N	Navy Facili	ties System	1/Y0995				
Cost Categories	Contract	Performing	Total	ı	FY 99	FY 00	FY 00		FY 01			
(Tailor to WBS, or System/Item Method	Method	Activity &	ΡΥs			₹ 00	Award	FY 01	Award	Cost to	Total	Target Value
Requirements)	& Type	Location	Cost	Cost		Cost	Date	Cost	Date	ø	Cost	of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation												
Subtotal T&E			0.000	0.000		0.000		0.000		0.000		
Remarks: Included in Product Development costs.	Developme	ant costs.										
Contractor Engineering Support												
Government Engineering Support												
Program Management Support												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: Not applicable.		į										
Total Cost			5.595	1.842		1.974		1.824			Cont	Cont
Remarks:												

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Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 8 of 8)

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EXHIBIT R-2, RDT&E Budget Item Justification	, RDT&E Bud	get Item J	ustification				DATE:	Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE	MENCLATURE				
RESEARCH DEVELOPMENT TEST & EVALUATION	ION, NAVY BA 4	A 4			Ship Self Defense/0603755N	ense/0603755P				
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Total PE Cost		15.756	8.607	6.610	8.919	9.064	9.270	9.678	CONT.	CONT.
QRCC / K2133/U2133/22133		6.863	2.984	0.000	2.166	2.177	2.224	2.471	CONT.	CONT.
Force AAW Coord. Tech. (FACT)/ K2184/U2184		8.893	5.623	6.610	6.753	6.887	7.046	7.207	CONT.	CONT.
Quantity of RDT&E Articles										

A. (U) Mission Description and Budget Item Justification:

environment. Quick Reaction Combat Capability (QRCC), Project K2133, provides advanced concepts and technology developments for the multi-sensor integration of ship detection equipment, integration and coordination of ship self defense weapons, and coordination of hardkill and softkill assets to improve individualship self defense capabilities against the ASCM threat. Force Anti-Air Warfare Coordination Technology (FACT), Project K2184, demonstrates Force Anti-Air Warfare (AAW) concepts and capabilities which will enhance the AAW weapon system through more effective the developmentof advanced concepts and capabilities that will enhance both defense in depth of ships in a force and self defense of individual ships in a littoral war-fighting This program incorporates efforts dedicated to the enhancement of ship self defense against Anti-Air Warfare (AAW) threats. Its primary focus is on the development of technologies, systems, and procedures necessary to defeat the evolving Anti-Ship Cruise Missile (ASCM) threat. These projects focus on ship defense improvements through use of tactical data, and force sensors and weapons.

B. (U) Program Change Summary				
	FY 1999	FY 2000	FY 2001	
FY 2000 President's Budget:	12.120	5.654	7.707	
Appropriated Value:	12.337	8.654		
Adjustment to FY 1999/2000 Appropriated Value/				
FY 2000 President's Budget:	3.419	-0.047	-1.097	
FY 2001 PRES Budget Submit:	15.756	8.607	6.610	

Funding: FY99 reductions are due to congressional undistributed reductions of (-\$.547), CVN-68 integration (+\$2.597), BTR of (+\$1.400) and minor pricing adjustments (\$0.097). FY 2001 Affordability reduction of (-\$1.000), and other minor pricing adjustments (\$0.097).

FY 2000 PLAN: (\$0.611) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, page 1 of 9)

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EXHIBIT	R-2a, RDT&E Project Justification	E Project Jus	stification				DATE:			
								Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM E	PROGRAM ELEMENT NAME AND NUMBER	E AND NUMBE		PROJECT NA	PROJECT NAME AND NUMBER:	BER:			
RDT&E, N BA4	SHIP SELF	SHIP SELF DEFENSE 063755N	063755N		FORCE AAW	COORDINAT	FORCE AAW COORDINATION TECHNOLOGY K2184/U2184	OGY K2184/	U2184	
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		8.893	5.623	6.610	6.753	6.887	7.046	7.207	CONT.	CONT.
RDT&E Articles Qty										

capabilities will provide the ship defense flexibility needed to meet the threat brought about by increasing numbers of highly sophisticated weapons held by potentially hostile A. (U) Mission Description and Budget Item Justification: Force Anti-Air Warrare Coordination I echnology (FACL) Program is an auvance use enquirement to be defense of the Act capabilities against current and future AAW threats. FACT improvements are designed to enhance the AAW warfighting ability of ships and aircraft and to enable coupling of the Force into a single, distributed AAW weapon system and towards more effective use of tactical data and the cooperative use of all the force sensors and weapons. These third world countries. FACT defines requirements and develops prototype systems or modifications to existing systems to test new concepts for the coordination of Force (U) Mission Description and Budget Item Justification: Force Anti-Air Warfare Coordination Technology (FACT) Program is an advanced developmenteffort designed to AAW operations. Some examples of prototype systems now in production are AN/SPS-48C Detection Data Converter, AN/SPS-48E Environmental Control Feature, Shipboard Gridlock System Automatic Correlation (SGS/AC) and Dial-a-Track Link-11 Quality Selection. Other FACT developments nearing production stages are the Automatic Identification System (Auto-ID) and the Multi-Frequency Link-11 capability; Dual Net Multi-Frequency Line (DNMFL); Force Threat Evaluation Weapons Assignment (FTEWA); and the prototype Area Air Defense Commander (AADC) capability. Short and long term objectives will be phased in to produce higher degrees of ship defense and battle coordination and effectiveness.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

- (U) FY 1999 ACCOMPLISHMENTS:
- (U) (\$4.815) Continued AADC concept developmentand evaluation, beginning the integration of air space deconfliction capabilities, Combat Air Patrol (CAP) stationing, and Engage on Remote (EOR).
 - (U) (\$3.263) Supported DNMFL experiments in IKE Battle Group, USS LaSalle; supported AADC experiments with the AADC prototypes at land based facilities and at-sea (USS SHILOH and MT WHITNEY)
 - (U) (\$.815) Supported Navy and Joint link interoperability

R-1 SHOPPING LIST - Item No. 70-2 of 70-9

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 2 of 9)

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LIRIHX3	R-2a, RDT&E Project Justification	DATE:	
		February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N BA4	SHIP SELF DEFENSE 0603755N	FORCE AAW COORDINATION TECHNOLOGY K2184/U2184	

(U) FY 2000 PLAN:

- (Ú) (\$1.448) Continue concept development of advanced air defense command and control capabilities, including development of concepts to support CAP/SAM coordination, coordination, coordinated cooperative engagements, and advanced air defense capabilities, including Upper Tier Systems.
 (U) (\$0.852) Support landbased and at-sea experiments of advanced Command and Control systems to evaluate air defense concepts and capabilities, including multi-
- TADIL operations, and air defense operations.
- (U) (\$1.000) Develop concepts and capabilities to support the integration of Multi-TADIL and cooperative engagement networks across Joint air defense systems, improve Navy and Joint Link interoperability.
 - (U) (\$0.150) Provide top-level programmatic support, technical analysis, and assist in the development of processes, procedures, and documentation that impact the execution of the FACT program requirements.
- . (U) (\$2.173) Develop concepts and define requirements for detection, control and engagement of time sensitive targets beyond the Fire Support Coordination Line (FSCL).

(U) FY 2001 PLAN:

- (U) (\$0.852) Support landbased and at-sea experiments of advanced Command and Control systems to evaluate air defense concepts and capabilities, including multi-TADIL operations, and air defense operations.
- (U) (\$1.000) Develop concepts and capabilities to support the integration of Multi-TADIL and cooperative engagement networks across Joint air defense systems, improve
- Navy and Joint Link interoperability.
 (U) (\$ 4.758) Develop concepts and define requirements for detection, control and engagement of time sensitive targets beyond the Fire Support Coordination Line (FSCL)

R-1 SHOPPING LIST - Item No. 70-3 of 70-9

(Exhibit R-2a, page 3 of 9) Exhibit R-2a, RDT&E Project Justification

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EXHIB	EXHIBIT R-2a, RDT&E Project Justification	DATE:
APPROPRIATION/BUDGET ACTIVITY RDT&E, N BA 4	PROGRAM ELEMENT NAME AND NUMBER SHIP SELF DEFENSE	PROJECT NAME AND NUMBER FORCE AAW COORDINATION TECHNOLOGY K2184/U2184
B. (U) Other Program Funding Summary: Not applicable.	ot applicable.	
C. (U) Acquisition Strategy: Not applicable		
D. (U) Schedule Profile: Not applicable		

R-1 SHOPPING LIST - Item No. 70-4 of 70-9

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 4 of 9)

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								DATE				
Exhibit R-3 Cost Analysis (page 1)	ge 1)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	VITY	PROGRAM ELEN	LEMENT			PROJECT NA	PROJECT NAME AND NUMBER:	BER:				
RDT&E, N BA 4		SHIP SELF DEFENSE 0603755N	DEFENSE	0603755N				E AAW COO	RDINATION T	FORCE AAW COORDINATION TECHNOLOGY K2184/U2184	184/U2184	
Cost Categories	Contract	_ _	Total						FY 01	Ç		7
(Tailor to WBS, or System/Item	Method & Type	Activity &	PY s Cost	FY 99 Cost	Award Date		Award	FY 01 Cost	Award Date	Cost to Complete	l otal Cost	i arget value of Contract
Primary Hardware Development	CPFF	REL, MD	408	40	86/	323	.66	610	10/00	CONT.	CONT	
Systems Engineering		SPAWAR, S.D.		0.150	66/80							
Systems Engineering		SPAWAR, NORFOLK		0.417	66/90							
Systems Engineering		PUGET SOUND BOSTON		0.029	04/99							
Tooling												
GFE												
Award Fees												
Subtotal Product Development			50.408	8.436		5.623		6.610		CONT.	CONT	
Remarks:										,		
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support		NSWC/PHD		0.175	66/80							
Integrated Logistics Support		NSLC MECH. PA		0.005	66/60							
Integrated Logistics Support	GSA	AMERIND		0.111	02//99							
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.291		0.000		0:000		0.000	0.291	
Remarks:												
												-

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Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 5 of 9)

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APPROPRIATION/RINGET ACTIVITY	/ ₂ / ₂ / ₂	PROGRAM EL	AM ELEMENT			IPROJECT N	PROJECT NAME AND NUMBER:	MBER:				
DOTE N BA4	•	SHIP SELF	FI F DEFENS	DEFENSE 0603755N	z		FOF	SCE AAW COC	RDINATION	FORCE AAW COORDINATION TECHNOLOGY K2184/U2184	2184/U2184	
	Contract	Performing			FY 99		1		FY 01			
, or System/Item	Method & Tyne		PY s	FY 99 Cost	Award	FY 00 Cost	Award	FY 01 Cost	Award	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	906	Focasion	1000									
Operational Test & Evaluation												
Tooling												
GFE							-	0000		900	000	
Subtotal T&E			0000	0.000		0000		0.000		0.000	0.000	
Remarks:												1
Contractor Engineering Support	CPAF	RGE SPRINGFIELD, VA	-	90:00	02/99							
	טפננ	CDA EAIDEAY VA		0 100	66/60							
	1100	COCON FALLS CHIR VA	Α/	0900	04/99							
,												
Program Management Support												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.000	0.166		0.000		0000		0.000	0.166	
Remarks:												
Total Cost			50.408	8.893		5.623		6.610		CONT.	CONT.	CONT.
Remarks:												
			R-1 SH	OPPING LIS	R-1 SHOPPING LIST - Item No. 70-6 of 70-9	70-6 of 70-9						

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 6 of 9)

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	a, KUI &E	R-2a, RDT&E Project Justification	tification				DATE:	Febr	February 2000	
TION/BUDGET ACTIVITY	ROGRAM EL	PROGRAM ELEMENT NAME AND NUMBER	AND NUMBE		PROJECT NA	PROJECT NAME AND NUMBER	BER			
RDT&E, N	HIP SELF	SHIP SELF DEFENSE 0603755N	603755N			Quick R	eaction Comb	at Capability (Quick Reaction Combat Capability (QRCC)/22133	
COST (\$ in Millions)	FY 1998	FY 1998 FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost	0.000	6.863	2.984	0.000	2.166	2.177	2.224	2.471	CONT.	CONT.
RDT&E Articles Qty										

A. Mission Description and Budget Item Justification: Quick Reation Combat Capability (QRCC) provides advanced concepts and technology developmentsfor the multi-sensor integration of ship detection equipment, integrationand coordination of ship self defense weapons, and coordination of hardkill and softkill assets to improve individualship self defense capabilities against the ASCM threat. The funding for the Self Defense Test Ship is for the dry-docking and overhaul of the Self Defense Test Ship to extend the service life for another 4 years.

- (U) FY 1999 ACCOMPLISHMENTS:
 (U) (1.804) Conduct the LPD-17 Analysis of Alternatives including capstone requirement analysis.
 (U) (2.597) Began systems engineering for the QRCC integration efforts on CVN-68.
 (U) (2.462) Completed follow-on test and evaluation on Self Defense Test Ship for SSDS MK1.
- 2. (U) FY 2000 PLAN:

- (U) (2.984) Complete dry-docking and overhaul of the Self Defense Test Ship.
- 3. (U) FY 2001 PLAN: Not Applicable
- B. Other Program Funding Summary: Not Applicable
- C. Acquisition Strategy: Not Applicable
- D. Schedule Profile:

R-1 SHOPPING LIST - Item No. 70-7 of 70-9

(Exhibit R-2a, page 7 of 9) Exhibit R-2a, RDT&E Project Justification

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								DATE:				
Exhibit R-3 Cost Analysis (page 1)	=									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY		PROGRA	PROGRAM ELEMENT			PROJECT N	PROJECT NAME AND NUMBER	1BER				
RDT&E, N		SHIP SI	SHIP SELF DEFENSE 0603755N	0603755N					Ship Self Defense/22133	nse/22133		
ies	ontract P.	Contract Performing	Total		FY 99		FY 00		FY 01	;		;
, or System/Item	Method	Activity &	ΡΥs	FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target Value
	Type	ocation	Cost	Cost	Date	Cost	Date	Cost	Date	Complete		of Contract
are Development											0.000	
Ancillary Hardware Development											0.000	
	Various Va	Various		4.955						0.000	4.955	
											0.000	
Tooling											0.000	
GFE			-								0.000	
Award Fees											0.000	
Subtotal Product Development				4.955		0000		0.000		0000	4.955	
Remarks:											000	
Development Support Equipment	1										0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support				0.000		0.000		0.000		0.000	0.000	
Remarks:												
			R-1 SHC	R-1 SHOPPING LIST - Item No. 70-8 of 70-9	- Item No.	70-8 of 70-9						

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 8 of 9)

UNCLASSIFIED

								DATE:				
Exhibit R-3 Cost Analysis (page 2)	je 2)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	ΊΤΥ	PROGRAM ELEMENT	ELEMENT			PROJECT N	PROJECT NAME AND NUMBER	MBER				
RDT&E, N		SHIP SEL	SHIP SELF DEFENSE 0603755N	0603755N		Ship Self Defense/22133	fense/22133					
Cost Categories	Contract	Performing Activity &	Total PY s	66 Ad	FY 99 Award	FY 00	FY 00 Award	FY 01	FY 01 Award	Cost to	Total	Target Value
Sequirements)	& Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Developmental Test & Evaluation	WR	PHD NSWC, CA		1.748		2.984				CONT.	CONT.	
Operational Test & Evaluation											0.000	
Tooling											0.000	
SFE											0.000	
Subtotal T&E				1.748		2.984		0.000		CONT.	CONT.	
Remarks:												
Contractor Engineering Support											0.000	
Sovernment Engineering Support											0.000	
Program Management Support	CPFF	Various		0.150						CONT.	CONT.	
[rave]				0.010							0.010	
abor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management				0.160		0.000		0.000		CONT.	CONT.	
Remarks:												
Fotal Cost				6.863		2.984		0.000		CONT.	CONT.	CONT.
Remarks:												
			R-1 SHO	PPING LIST	- Item No.	R-1 SHOPPING LIST - Item No. 70-9 of 70-9			1		•	

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 9 of 9)

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

February 2000 DATE:

> PROGRAM ELEMENT: 0603790N 4 UDGET ACTIVITY:

PROJECT NUMBER: PROGRAM ELEMENT TITLE: NATO Research and Development

NATO Cooperative R&D R2293 PROJECT TITLE:

U) COST: (Dollars in Thousands)

ection 2350a, Cooperative Research and Development (R&D) Projects: Allied Countries. The objective is to improve, through he application of emerging technologies, the conventional defense capabilities of the United States, the North Atlantic reaty Organization (NATO), and U.S. major non-NATO allies. This program element only funds the U.S. equitable share of the hird party transfers. The international agreements supported by this project are US Department of Defense and Department of greements that define the scope, cost and work sharing arrangements, management, contracting, security, data protection and he U.S. work share in the United States at U.S. Government and U.S. contractor's facilities. The planned program is shown elow. The final program will be reported separately as required by Title 10 U.S. Code, Section 2350a. ncluding the identification of cooperative opportunities and administration of the program. All funds are used to pay for ooperative R&D project and is only spent in the U.S. Projects are implemented with allied partners through international he Navy signed commitments to joint projects with our allies. The projects jointly develop equipment to improve US and llied operational capabilities as well as achieve interoperability and standardization. Funds support all the R&D cost (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program implements the provisions of Title 10 U.S. Code,

U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and ntegrates hardware for experimental tests related to specific ship or aircraft applications.

R-1 Line Item 73

Budget Item Justification

(Exhibit R-2, page 1 of 6)

FY 2001 RDI&E, N BUDGET ITEM JUSTIFICATION SHEET

February 2000

UDGET ACTIVITY:

PROGRAM ELEMENT TITLE: NATO Research and Development PROGRAM ELEMENT: 0603790N

NATO Cooperative R&D R2293 PROJECT NUMBER: PROJECT TITLE:

PROGRAM ACCOMPLISHMENTS AND PLANS: Ð

(U) FY 1999 ACCOMPLISHMENTS: ς.

- (\$1,000) Supported on-going work related to the U.S./United Kingdom Anti-Torpedo Torpedo cooperative Research and Development project.
 - (U) (\$1,600) Supported on-going work related to the cooperative R&D program between the U.S. and United Kingdom for Trimaran Hull initiated with OSD funding.
 - (\$1,100) Supported on-going work on the U.S./Japanese Cooperative Material Project for Advanced Steel
 - (\$2,500) Supported work on the Vector Project between the U.S. and Germany.
 - 756) Supported efforts on the High Speed Protocol Project with France.
- 539) Supported work on the Unmanned Undersea Vehicle cooperative R&D project between the U.S. and France initiated with OSD funding.
- (U) (\$1,169) Supported on-going Navy work related to the U.S./United Kingdom development of the Intercooled Recuperated (ICR) Gas Turbine Engine.
- (U) (\$1,000) Supported Norwegian Mineclearing.
- FY 2000 PLAN: Đ . ო
- (\$1,766) Support work on the Vector Project between the U.S. and Germany
- (\$ 373) Support Fiber Optic Bottom Mounted Acoustic Array.
- 752) Support efforts on the Multilateral Memorandum of Understanding for Interoperable Network for Secure Communications.
 - 327) Support on-going work related to the U.S./United Kingdom Anti-Torpedo Torpedo cooperative R&D

R-1 Line Item 73

Budget Item Justification

(Exhibit R-2, page 2 of 6)

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 2000

UDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603790N

PROJECT NUMBER: R2293

PROGRAM ELEMENT TITLE: NATO Research and Development

PROJECT TITLE: NATO Cooperative R&D

- 650) Support on-going Navy efforts on the U.S./Japanese Cooperative Material Project for Advanced Steel initiated with OSD funding.
- (\$ 373) Support work on the Unmanned Undersea Vehicle cooperative R&D project between the U.S. and France initiated with OSD funding.
- (U) (\$1,190) Support on-going work related to the cooperative R&D project between the U.S. and United Kingdom for Timaran Hull initiated with OSD funding
- 4. (U) FY 2001 PLAN:
- (U) (\$2,450) Support work on the Vector Project between the U.S. and Germany.
- (U) (\$1,942) Support efforts on the Multilateral Memorandum of Understanding for Interoperable Network for Secure Communications.
- (U) (\$1,400) Support work on the Allied Warfare Project between the U.S. and United Kingdom.
- (U) (\$ 700) Support Fiber Optic Bottom Mounted acoustic Array.
- Support work on the Six (6) Degrees of Freedom Ship Roll Project with Italy. (\$1,100)
- (\$1,400) Support work on the Network Centric Battlespace Management Project between the U.S. and United
- (U) PROGRAM CHANGE SUMMARY:

::	
Budget	
President's	יסנינים זום ליין:
FY 2000	Do to trans
(U) F	/TT/

- (U) Appropriated Value:
 (U) Adjustments from PRESBUDG:
- (U) Congressional Rescissions (U) Execution Adjustment

-30

868

FY 2001 9,053

FY 2000 5,461

FY 1999 8,852 R-1 Line Item 73

Budget Item Justification (Exhibit R-2, page 3 of 6)

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

February 2000 DATE:

> PROGRAM ELEMENT: 0603790N 4 UDGET ACTIVITY:

R2293 PROJECT NUMBER:

PROGRAM ELEMENT TITLE: NATO Research and Development

-15 -41

NATO Cooperative R&D PROJECT TITLE:

> (U) Strategic Source Adjustments FY 2001 PRESBUDG Budget Submission: Various Rate Adjustments NWCF Rate Adjustments Ð

SBIR/STTR Adjustment

CHANGE SUMMARY EXPLANATION:

5,431

9,664

8,992

Ð)

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

(U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

RELATED RDT&E: Ð

(U) PE 0603790D (NATO Cooperative Research and Development)
 (U) PE 0605853N (Management, Technical and International Support)
 (U) PE 0605130D (Foreign Comparative Testing)

SCHEDULE PROFILE: Not applicable. 9 R-1 Line Item 73

Budget Item Justification (Exhibit R-2, page 4 of 6)

FY 2001 RDT&E, N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

R2293

February 2000

PROGRAM ELEMENT TITLE: NATO Research and Development PROGRAM ELEMENT: 0603790N

NATO Cooperative R&D PROJECT NUMBER: PROJECT TITLE:

(U) PROJECT COST BREAKDOWN: (\$ in thousands)

UDGET ACTIVITY:

FY 2001 8,992 FY 2000 5,431 FY 1999 9,664 . Cooperative Research and Development roject Cost Categories

(U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION:

ERFORMING ORGANIZATIONS

Total Program	CONT. CONT. CONT.
To	CONT. CONT.
FY 2001 Budget	0 550 2,300 6,142
FY 2000 Budget	0 180 1,500 3,751
FY 1999 Actual	400 1,610 2,000 5,654
Project Office EAC	
Perform Activity EAC	
Award/ Oblig <u>Date</u>	12/26/91 1/31/97
Contract Method/ Fund Type Vehicle	C/CPAF WX
ontractor/ Contract overnment Method/ erforming Fund Type ctivity Vehicle roduct Development	estinghouse SWC-CD oeing iscellaneous

upport and Management: Not applicable.

Not applicable. est and Evaluation: OVERNMENT FURNISHED PROPERTY: Not applicable.

R-1 Line Item 73

UNCLASSIFIED

PE/Project Cost Breakdown (Exhibit R-3, page 5 of 6)

FY 2001 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

4

UDGET ACTIVITY:

PROGRAM ELEMENT: 0603790N PROGRAM ELEMENT TITLE: NATO Research and Development

PROJECT NUMBER: R2293 PROJECT TITLE: NATO Cooperative R&D

DATE: February 2000

Program Total CONT. CONT. Complete Ţ CONT. CONT. 0 0 FY 2001 Budget 8,992 8,992 0 0 FY 2000 Budget 5,431 5,431 FY 1999 Actual 9,664 9,664 ubtotal Support and Management ubtotal Product Development ubtotal Test and Evaluation otal Project

R-1 Line Item 73

UNCLASSIFIED

PE/Project Cost Breakdown (Exhibit R-3, page 6 of 6)

UNCLASSIFIED

EXHIBIT R-2, RDT&E		Budget Item Justification	ıstification				DATE:			
		ı						Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY	ON, NAVY/E	/BA-4			R-1 ITEM NOMENCLATURE Gun Weapons Systems Tech	AENCLATURE Systems Tech	R-1 ITEM NOMENCLATURE Gun Weapons Systems Technology/0603795N	SN 5		
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost		87.466	116.839	143.044	125.772	57.278	57.737	83.536	CONT	CONT
NSFS/K2156/K2624*		61.038	62.291	51.969	32.991	12.920	7.662	14.892	CONT	CONT
ALAM/K2324		0.501	0.000	19.809	33.141	11.874	28.676	48.425	CONT	CONT
NFCS/K2325		18.560	26.864	49.027	40.520	24.699	21.399	20.219	CONT	CONT
LASM/K2409		7.367	21.717	22.239	19.120	7.785	0.000	000'0	0.000	80.928
NSWC Continuous Processor/K2771 **		0.000	5.967	0.000	0.000	0.000	0.000	0.000	0.000	5.967
Quantity of RDT&E Articles & Cost (see attached projects)										

Funding includes the following Congressional adds for ERGM Project K2624: FY 1999 \$7.745M and FY 2000 \$9.945M.

FY 2000 Congressional add for Continuous Processor, Naval Surface Warfare Center, Indian Head.

variety of weapons systems including both gun and missile systems that can provide the required range, lethality, accuracy, and responsiveness. The NSFS program (Project mission. In order to meet the United States Marine Corp (USMC) requirements for NSFS in support of Operational Maneuvers from the Sea (OMFTS), the Navy is developing a K2156/K2624) develops gun systems including the 5"/62 gun (a modification of the existing 5"/54 gun); a 5" Extended Range Guided Munition (ERGM) with a coupled internal attack battle management duties to be interoperable and consistent with joint C4ISR systems. These shipboard weapon systems will significantly improve the Navy's ability to capability using upcoming technology to fully meet extended range requirements and service the land attack target set as derived from the OMFTS strategy. The Naval Fires support OMFTS. This program element also includes the transition of Advance Technology Demonstrations (ATDs) and Pre-Planned Product Improvements (P3Is) into the NSFS program. In FY 2000 this program element includes a Congressional addition for the Continuous Processor, Naval Surface Warfare Center, Indian Head (NSWC IH) Control System (NFCS) (Project K2324) develops systems that will support mission planning for 5"/62 - ERGM and Land Attack Missiles. It will automate shipboard land propelling charge improvements. In order to satisfy USMC requirements for longer range, responsive fire support, the Navy is developing a land attack variant of the Land Attack Standard Missile (LASM) (Project K2409). In addition, the Advance Land Attack Missile (ALAM) (Project K2324) is being developed to expand the interim LASM Global Positioning System (GPS) and Inertial Navigation System (INS) capable of delivering a submunition payload to a range of 63 Nautical Miles (NM); and associated A. (U) Mission Description and Budget Item Justification: The Gun Weapons Systems Technology program element supports the Naval Surface Fire Support (NSFS) (Project K2771). The continuous processor program will support the advancement and implementation of a lower cost, safer, and less polluting technology for the manufacturing of energetics that will benefit many Navy systems that rely on energetic materials to meet their operational requirements.

R-1 SHOPPING LIST - Item No. 74 - 1 of 74 - 25

Exhibit R-2, RDT&E Budget Item Justification

(Exhibit R-2, page 1 of 25)

UNCLASSIFIED

EXHIBIT R-2, RDT&E Budget Item Justification	Justification		DATE:	February 2000
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4		R-1 ITEM NOMENCLATURE Gun Weapons Systems Technology/0603795N	nology/0603795N	
B. (U) Program Change Summary:	FY 1999	FY 2000	FY 2001	
FY 2000 President's Budget: Appropriated Value:	78.858 105.604	101.489 117.488	93.494	
Adjustment to FT 1939/2000 Appropriated value) FY 2000 President's Budget: FY 2001 President's Budget Submit:	-18.138 87.466	-0.649 116.839	49.550 143.044	
•				

Funding:

FY 1999: Adjustment is due to termination of the NTACMS program (\$-11.301), transfer of Vertical Gun Advanced System (VGAS) to PE 0603513N (\$-15.169), increases for Micro-Electro-Mechanical System (MEMS) (\$+1.500), Land Attack Standard Missile (\$+7.400), ERGM (\$+2.033), and Advanced Land Attack Missile (ALAM) (\$+0.501), a SBIR/STTR transfer (\$-1.591), and decreases for various minor adjustments (\$-1.511).

FY2000: Adjustment is due to various minor adjustments (\$-0.649).

FY 2001: Adjustment is due to increases for ERGM (\$+11.800), Naval Fires Control System (\$+19.000), and ALAM (\$+20.000), and decreases for various minor adjustments

Note: In accordance with 15 USC 638, \$2.21M in FY 2000 is reserved for the Small Business Innovation Research (SBIR) assessment.

closed its developmental plant in Lewisville, TX and moved ERGM related development activities to Tucson, AZ. The prime contractor has submitted a proposal to rebaseline Schedule: Since the ERGM contract award in September 1996, the contractor has experienced numerous technical challenges. In addition, the prime contractor recently the ERGM program to address the technical challenges and the move to Tucson. The Government is still in negotiation for resolution.

Technical: N/A

R-1 SHOPPING LIST - Item No. 74 - 2 of 74 - 25

(Exhibit R-2, page 2 of 25) Exhibit R-2, RDT&E Budget Item Justification

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	ification				DATE:			
								Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	EMENT NAME	AND NUMBE	2	PROJECT NAME AND NUMBER	ME AND NUME	ER.			
RDT&E, N/BA-4	Gun Weapons S	ns Systems	Systems Tech/0603795N	795N	Naval Surface Fire Support/K2156/2624	Fire Support/K	2156/2624			
COST (\$ in Millions)		FY 1999*	FY 2000**	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		61.038	62.291	51.969	32.991	12.920	7.662	14.892	CONT	CONT
RDT&E Articles Qtv					80					

* FY 1999 funding includes \$7.745M Congressional Plus Up for ERGM Project K2624; BTR 99-55 for \$4.033M for ERGM/MEMs K2156. ** FY2000 funding includes \$9.945M Congressional Plus Up for ERGM Project K2624.

A. (U) Mission Description and Budget Item Justification: These funds provide for the development of the 5"/62 Extended Range Guided Munition (ERGM) weapons system which consists of a: 5" MK 45 gun modification which strengthens the gun to accommodate higher firing loads (18 megajoules) to fire the EX 171 Extended Range Guided Munition (ERGM); ERGM, a 5" munition with an internal Global Positioning System receiver coupled with an inertial Navigation System capable of delivering a submunitions to a range of 63NM; a gun fire control system which updates the MK 160 MOD 7 to a MOD 8 providing direct digital interface with the gun as well as the ERGM; and an upgraded propelling charge to provide the higher gun firing energy required by ERGM. This project also includes the transition of ATDs and P³Is into the NSFS envelope.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1999 ACCOMPLISHMENTS:

- (\$38.228) Continued development of EX-171 EDMs for ERGM. Continued rocket motor testing and component integration.
 - (\$ 4.492) Continued development of EX-167 Propelling Charge.
- (\$10.868) Continued development of 5" MK 45 modification and Government Furnished Property (GFP) preparation. Commenced test firing. (\$ 4.820) Continued development of the Gun Fire Control modification and required interfaces. (\$ 1.130) Analyzed life cycle costs and evaluated tradeoffs. (\$ 1.130) Analyzed life cycle costs and evaluated tradeoffs. (\$ 1.500) Continue development of the Micro-Electro-Mechanical System (MEMS).

(U) FY 2000 PLAN:

- (\$42.629) Continue development of EX-171 EDMs for ERGM. Continue rocket motor testing and component integration.
 - (\$ 1.406) Continue development of EX-167 Propelling Charge.
- Continue development of 5" MK 45 Modification and GFP preparation.
- (\$ 11.500) Continue development of 5" MK 45 Modification and GFP preparation.
 (\$ 4.240) Continue development of the Gun Fire Control modification and required interfaces.
 (\$ 2.016) Analyze life cycle costs and evaluated tradeoffs

R-1 SHOPPING LIST - Item No. 74 - 3 of 74 - 25

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 3 of 25)

UNCLASSIFIED

EXF	EXHIBIT R-2a, RDT&E Project Justification	DATE:	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER		
RDT&E. N/BA-4	Gun Weapons Systems Tech/0603795N	Naval Surface Fire Support/K2156/2624		

2. (U) FY 2000 PLAN: (Continued)

- (U) (\$ 0.500) Continue development of the Micro-Electro-Mechanical System (MEMS).

(\$39.120) Continue development of EX-171 EDMs for ERGM. Continue rocket motor testing and component integration. 3. (U) FY 2001 PLAN: - (U) (\$39.120) Cont

(\$ 1.448) Continue development of EX-167 Propelling Charge.
(\$ 6.800) Continue development of 5" MK 45 modification and GFP preparation. Commence test firing of the modification.
(\$ 2.695) Continue development of the Gun Fire Control Modification and required interfaces.
(\$ 1.906) Analyze life cycle costs and evaluated tradeoffs.

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B. (U) Other Program Funding Summar <u>FY 1999</u> FY 2	ummary: FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total <u>Cost</u>
PAN,MC BL, 025300 14.225	2.992	5.723	6.233	32.155	56.982	0.000	CONT.	CONT.

(U) Related RDT&E,N: N/A

C. (U) Acquisition Strategy: A competition was held in FY 96 for the ERGM. It resulted in an award to Texas Instruments (now Raytheon Systems Company) with a corporate investment of 47.5% of development cost. The gun is being developed under a sole source arrangement with United Defense, the current MK 45 MOD 2 producer. The Fire Control (MK 160) and the propelling charge are being developed by the Naval Surface Warfare Center, Indian Head since they are modifications to current government owned/supplied equipment.

R-1 SHOPPING LIST - Item No. 74 - 4 of 74 - 25

(Exhibit R-2a, page 4 of 25) Exhibit R-2a, RDT&E Project Justification

R-1 SHOPPING LIST - Item No. 74 - 5 of 74 - 25

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 5 of 25)

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									DATE:				
Exhibit R-3 Cost Analysis (page 1	e 1)					!					February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	7	PROG	PROGRAM ELEMENT	INI			PROJECT NA	PROJECT NAME AND NUMBER	3ER				
RDT&E, N/BA-4		Gun V	Gun Weapons Syster	Systems	ns Tech/0603795N	3795N	Naval Surface	Naval Surface Fire Support/K2156/2624	2156/2624				
Cost Categories	Contract	Contract Performing	Total			FY 99				FY 01			
(Tailor to WBS, or System/Item	Method	Activity &	PΥs		FY 99	Award	FY 00	Award	FY 01	Award	Cost to	Total	Target
(Requirements)	& Type	Location	Cost		Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Primary Hardware Development	SPFF	UDLP, Minneapolis, MN		42.961	8.517	10/98	7.200	12/99	5.400	10/00	CONT	CONT	44.726
	CPAF/IF	CPAF/IF Raytheon	6	33.237	23.428	10/98	29.952	Various	25.200	10/00	CONT	CONT	87.000
		Texas Inst.,											
	WR	NSWC Dahlgren, VA		39.999	16.868	10/98	17.174	11/99	13.063	10/00	CONT	CONT	N/A
	WR	NSWC Indian Head, MD		11.024	4.065	10/98	1.899	11/99	1.841	10/00	CONT	CONT	N/A
	WR	NSWC Port Hue., CA		23.096	2.290	10/98	2.343	11/99	2.283	10/00	CONT	CONT	N/A
MEMS	VAR	Miscellaneous		0.000	1.500	Various	0.500	Various	0.000		CONT	CONT	N/A
Systems Engineering	VAR	Miscellaneous	4	48.357	3.623	10/98	2.975	11/99	4.000	10/00	CONT	CONT	N/A
Award Fees	CPAF/IF	CPAF/IF Raytheon		1.123	0.647	66/9	0.148	12/99; 6/00	0.082	12/00; 06/01	0.019	2.019	2.070
		Texas Inst.,											
Subtotal Product Development			# 	199.797	60.938		62.191		51.869		CONT	CONT	CONT

Remarks: The budget for each development contract is higher than the target value based on the program managers estimate of what will be needed to cover changes to requirements and cost growths.

							Ī
Development Support Equipment						0.000	
Software Development						0.000	
Training Development						0.000	
Integrated Logistics Support						0.000	
Configuration Management						0.000	
Technical Data						0.000	
DEET.						0000	
Subtotal Support	0.000	0.000	0.000	0.000	0.000	0.000	

Remarks:

R-1 SHOPPING LIST - Item No. 74 - 6 of 74 - 25

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 6 of 25)

CLASSIFICATION:

	;								DATE:				
Exhibit R-3 Cost Analysis (page 2)	je 2)										February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	ΙΤΥ		PROGRAM ELEMENT	EMENT	,000 C	14064	PROJECT N	PROJECT NAME AND NUMBER	ABER (2470/2004				
RDT&E, N/BA-4			Gun Weapons Systems Tech/0603/95N	ns system.	s lecn/upo.	NC6/S	Naval Surfac	Naval Surface Fire Support/KZ156/Z6Z4	KZ156/Z6Z4				
Cost Categories	Contract	Performing	 [FY 99	8	FY 00	5	FY 01	4	Toto L	Tornot Value
(Tailor to WBS, or System/Item	Method	Activity &	<u>. C</u>	N +0	Cost	Award	o ta	Award Date	Cost	Date	Complete	Cost	of Contract
Developmental Test & Evaluation	300	FOCGRICII			1000	200						0000	
Operational Test & Evaluation												0.000	
Tooling												0.000	
GFE												0.000	
Subtotal T&E				0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: Test & Evaluation included with hardware development.	ded with hai	rdware developn	nent.							:			
Contractor Engineering Support												0.000	
Government Engineering Support												0.000	
Program Management Support												0.000	
Travel	PD	NAVSEA HQ		0.223	0.100	Various	0.100	VAR	0.100	VAR	CONT	CONT	
Labor (Research Personnel)												0.000	
Overhead												0.000	
Subtotal Management				0.223	0.100		0.100		0.100		CONT	CONT	
Remarks:													
										•			
Total Cost				200.020	61.038		62.291		51.969		CONT	CONT	CONT
Bemarks:													
_													

R-1 SHOPPING LIST - Item No. 74-7 of 74 - 25

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 7 of 25)

UNCLASSIFIED

EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	ification		= -		DATE:	Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4	PROGRAM ELEMENT NAME AND NUMBER Gun Weapons Systems Tech/060379	EMENT NAME ns Systems	ENT NAME AND NUMBER Systems Tech/0603795N	12N	PROJECT NAME AND NUMBER Advanced Land Attack Missile/K2324	ME AND NUM d Attack Missil	BER 9/K2324			
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		0.501	0.000	19.809	33.141	11.874	28.676	48.425	CONT	CONT
RDT&E Articles Qty										

present interim capability provided by LASM in Aegis ships and to fully meet extended range requirements beyond present capability and service the land attack target set as derived from the OMFTS strategy. This capability shall be introduced into the DD21 Land Attack Destroyer to supplement its operational Mission Needs Statement. The ALAM will exploit upcoming technologies to service high threat mobile and stationary targets during all stages of conflict. It will be compatible with and integrated into future A. (U) Mission Description and Budget Item Justification: The Advanced Land Attack Missile (ALAM) and its associated weapons control system is intended to expand theater level command, control and other support weapons and systems. The program will proceed to a Milestones I and II decision in FY 2001 and FY 2003, respectively.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1999 ACCOMPLISHMENTS:
 (U) (\$0.501) Initiated Analysis of Alternatives (AOA).

2. (U) FY 2000 PLAN: (\$0)

3. (U) FY 2001 PLAN:
- (U) (\$19.809) Complete analysis of alternatives: Initiate concept development; Begin program development and risk reduction; Continue program planning and execution for Milestone I and Preliminary Design Review (PDR).

B. (U) Other Program Funding Summary: N/A

- (U) Related RDT&E,N: N/A

C. (U) Acquisition Strategy: Competitive development program FY01-03, down selected in FY03 after demo/fly-off.

R-1 SHOPPING LIST - Item No. 72 - 8 of 72 - 25

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 8 of 25)

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1 II III IV I II III IV Oown Select	Fiscal Year 99 00	Quarter I II III IV I I II III IV	Milestone	Analysis of Alternatives	Advanced Design Demo Aww	ЕМД
			MSI	\triangleright	Award(s)	
	03	VI III II I	TSW		Down Select	Award
	95	VI III II		-		
1 ппп 17	90	VI III III IV				CDR

R-1 SHOPPING LIST - Item No. 74 - 9 of 74 - 25

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 9 of 25)

CLASSIFICATION:

								DATE:				
Exhibit R-3 Cost Analysis (page 1	÷ 1)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	≥	PROGR	PROGRAM ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	ABER				
RDT&E. N/BA-4		Gun W	Gun Weapons Systen	ms Tech/0603795N	3795N	Advanced La	Advanced Land Attack Missile/K2324	ile/K2324				
	Contract	Contract Performing	Total		FY 99		FY 00		FY 01			
or System/Item	Method	Method Activity &	PYs	FY 99	Award	FY 00	Award	FY 01		Cost to	Total	Target
	& Type	Location	Cost	Cost	Date	Cost	Date	Cost		Complete	Cost	of Contract
Primary Hardware Dev Phase I & II C/CP	C/CP	ALAM Industry Team						15.000	10/00 & 3/01			
Ancillary Hardware Development												
	WR	NSWC, Dahlgren, VA	0.000	0.155		0000		1.000	10/00	CONT	CONT	
	SS/CPFF	SS/CPFF JHU/APL	0.000	0.090		0.000		1.000	10/00	CONT	CONT	
	WR.	NAWC, China Lake, CA	0000	0.000		0.000		0.309	10/00	CONT	CONT	
	VAR	Various (AOA contractors)	ors) 0.000	0.090		0.000		0.800	11/00	CONT	CONT	
Tooling												
GFE												
Award Fees												
Subtotal Product Development			0.000	0.335		0.000		18.109		CONT	CONT	CONT

Remarks: The budget for each development contract is higher than the target value based on the program managers estimate of what will be needed to cover changes to requirements and cost growths.

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Remarks:

R-1 SHOPPING LIST - Item No. 74 - 10 of 74 - 25

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 10 of 25)

UNCLASSIFIED

									DATE:				
Exhibit R-3 Cost Analysis (page 2)	9 2)										February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	Ł		PROGRAM ELEMENT	EMENT			PROJECT NA	PROJECT NAME AND NUMBER	MBER				
RDT&E, N/BA-4			Gun Weapo	Gun Weapons Systems Tech/0603795N	s Tech/060	3795N	Advanced La	Advanced Land Attack Missile/K2324	ile/K2324				
	Contract	Performing				FY 99	9	FY 00	č	FY 01	0.00	1	Toront (1010)
(Tailor to WBS, or System/Item Requirements)	Method & Tvne	Activity &		Cost	Cost	Award	Cost	Date	Cost	Date	Complete	Cost	of Contract
Test & Evaluation													
Operational Test & Evaluation													
Tooling													
GFE													
Subtotal T&E				0.00	0.000		0.000		0.000			0.000	
Remarks:													
Contractor Engineering Support													
Government Engineering Support													
	_ ! !								,	30,7,	1.00	1	
im Management Support	VAR	VARIOUS		0.000	0.166		0.000		1.600	11/00	NOS G	IN CONT	
	<u>۵</u>	NAVSEA HQ		0.000	0.000		0.000		0.100	VAR	CON	NOS CON	
Labor (Research Personnel)													
Overhead													
Subtotal Management				0.000	0.166		0.000		1.700		CONT	CONT	
Remarks:													
Total Cost				0.000	0.501		0.000		19.809		CONT	CONT	CONT
Remarks:													
				2	FO. 1		TO 1 10 THE THE TOTAL TO A 44 - 574 OF	20					

R-1 SHOPPING LIST - Item No. 74 - 11 of 74 - 25

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 11 of 25)

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EXHIBIT	EXHIBIT R-2a, RDT&E Project Justification	Project Just	lification				DATE:			
		•						Febru	February 2000	
APPROPRIATION/BUDGET ACTIVITY RDT&E. N/BA-4	PROGRAM EL	ROGRAM ELEMENT NAME AND NUMBER our Weapons Systems Tech/0603795N	AND NUMBE Tech/0603	ER 1795N	PROJECT NAME AND NUMBER Naval Fires Control System/K2325	ME AND NUM	BER (2325			
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		18.560	26.864	49.027	40.520	24.699	21.399	20.219	CONT	CONT
RDT&E Articles Qty										

A. (U) Mission Description and Budget Item Justification: Naval Fires Control System (NFCS) covers the mission planning and coordination for future Naval Surface Fire caliber gun and the Land Attack Standard Missile (LASM) and LASM Fire Control. It will be available to amphibious ships, command ships, and the DD-21 program if selected by the full service contractor. The software may ultimately be integrated into future Tactical TOMAHAWK Weapons Control Systems (TTWCS), but will initially be Support system requirements. NFCS will plan, coordinate and manage the firing of the new Naval Surface Fires Support (NSFS) weapon systems including the 5"/62 hosted in the existing combat suite on DDG-81 for fleet introduction in FY 2002. Prototyping, demonstrations and developments will be conducted during FY 1999, FY 2000 and FY 2001

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

- 1. (U) FY 1999 ACCOMPLISHMENTS:
- (U) (\$12.066) Software development and system engineering including analysis, design and reuse of existing government and commercial computer programs to support ERGM, LASM, and other naval weapon applications.
 - (U) (\$ 4.050) Identified and configured hardware configuration to support NFCS implementation.
- (U) (\$ 1.174) Technical Direction Agent support, joint requirements investigation, Concept of Operations (CONOPs) scenario development.
- .300) C4I and combat system interface investigation and analysis including Battle Force Tactical Trainer (BFTT), LINK 16, TTWCS and other developing C41 system and technology.
 - (U) (\$.970) Developmental testing, and logistic support elements development.
- 2. (U) FY 2000 PLAN:(U) (\$15.354) Software and system engineering to include analysis, development, reuse and integration of government and commercial computer programs to support ERGM, LASM and other naval weapon applications.

- (U) (\$ 5.880) Support hardware configuration to support NFCS implementation. Support Developmental Testing (DT) Validation.
 (U) (\$ 1.930) Technical Direction Agent support, joint requirements investigation, Concept of Operations (CONOPs) scenario development.
 (U) (\$ 1.700) C4I and combat system interface investigation and analysis to include BFTT, Link 16, TTWCS and other developing C4I system and technology.
 (U) (\$ 2.000) Developmental test and evaluation and logistic support elements development.

R-1 SHOPPING LIST - Item No. 74 - 12 of 74 - 25

(Exhibit R-2a, page 12 of 25) Exhibit R-2a, RDT&E Project Justification

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	EXHIBIT R-2a, RDT&E Project Justification	DATE:	
			February 2000
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER	
RDT&E, N/BA-4	Gun Weapons Systems Tech/0603795N	Naval Fires Control System/K2325	

3. (U) FY 2001 PLAN:

- (U) (\$16.509) Software and system engineering to include analysis, development, reuse and integration of government and commercial computer programs to support ERGM, LASM and other naval weapon applications.
- Technical Direction Agent support, joint requirements investigation, Concept of Operations (CONOPs) scenario development. 3
- C4I and combat system interface investigation and analysis to include BFTT, Link 16, TTWCS and other developing C4I system and technology.
- LASM Fire Control system engineering and software development including interface development with NFCS, GPS and other weapon systems. (\$ 6.318) Support hardware configuration to support NFCS implementation. Support DT Validation.
 (\$ 2.700) Technical Direction Agent support, joint requirements investigation, Concept of Operations (CONOPs) sc.
 (\$ 1.000) C4I and combat system interface investigation and analysis to include BFTT, Link 16, TTWCS and other
 (\$ 3.500) Developmental test & evaluation, and logistic support elements development.
 (\$ 7.500) LASM integration design, development and integration includes modification to Vertical Launch System.
 (\$ 9.500) LASM Fire Control system engineering and software development including interface development with N (\$ 2.000) LASM Fire Control Program management and logistic support elements development. 22222
- B. (U) Other Program Funding Summary:

Total	Cost	CONT.
<u>٥</u>	Complete	CONT.
	FY 2005	3.300
	FY 2004	3.200
	FY 2003	2.500
	FY 2002	1.900
•	FY2001	
)	FY2000	
)	FY 1999	
		O&MN

(U) Related RDT&E,N: N/A

C. (U) Acquisition Strategy: The acquisition strategy has been approved. A sole source contract will be awarded to ITC for Phase 1. Phase 2 requirements will be either competed or an existing system development contract will be used.

R-1 SHOPPING LIST - Item No. 74 - 13 of 74 - 25

(Exhibit R-2a, page 13 of 25) Exhibit R-2a, RDT&E Project Justification

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DATE: February 2000			FY03 FY04 FY05 20 30 40 10 20 30 40 10 20 30 40		W WS III	, ind	<u> </u>	FOT&E	>		MS III		ΔI	,
EXHIBIT R-2a, RDT&E Project Justification	PROJECT NAME AND NUMBER Gun Weapons Systems Tech/0603795N Naval Fires Control System/K2325		FY99 FY00 FY01 FY02 10 20 30 40 40 40 40 40 40 4	Naval Fires Control System (NFCS)		Build 2		DT-IIA DT-IIB DT-OT-IIB DT-OT-IIB DT/OT IIC		Land Attack Missile Fire Control System (LAM FCS)	Option Evaluation & MAR II	Development ∇	Owl Tests ALBTV	
	APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4	D. (U) Schedule Profile:	FY98	《明·斯·斯·斯·斯·斯·斯·斯·斯·斯·斯·斯·斯·斯·斯·斯·斯·斯·斯·斯	Milestones	Design Development	Tests		Tests - DT/OT		Milestones	Design Development	Tests	

R-1 SHOPPING LIST - Item No. 74 - 14 of 74 - 25

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 14 of 25)

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Exhibit R-3 Cost Analysis (page 1)	ie 1)							DATE:		February 2000	000	
APPROPRIATION/BUDGET ACTIVITY	<u></u>	PROGRAM ELEMENT	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E, N/BA-4		Gnu Weal	Gun Weapons System	ns Tech/0603795N	3795N	Naval Fires C	Navai Fires Control System/K2325	K2325				
Cost Categories	Contract	Performing	Total		FY 99		FY 00		FY 01	:		:
(Tailor to WBS, or System/Item	Method	Activity &	PYs	FY 99	Award	FY 00	Award	FY 03	Award	Cost to	Total	larget Value
Requirements)	& Iype	& Type Location	Cost	Cost	Date	Cost	Dale	2000	Date	COLIDIGIE	COST	1000
Primary Software Development	SS/CPFF	ITC, Arlington, VA	0.000	3.500	66/10	0.000	44,000,000	0.000	14,00	DOUGO FINOS	3.300	TBD
	PAF	SS/CPAF ITC, Arlington, VA	00.00	3.404	66/90	11.200	091/88/LD	12.300	11/99	INOS C	ENOS C	G
	WR	NSWC, Dahlgren, VA	0.000	1.000	11/98	1.300	11/99	1.600	10/99	I I	100	
		VARIOUS	0.000	0.919	11/98	0.700	02/00	0.400	11/00	NOS (INOS	
Systems Engineering	WR	SSC/SD	0.000	1.500	02/99	1.451	11/99	1.700	10/00	CONT	CONT	
	SS/CP	VITRO	0.000	0.300	11/98	0.300	11/99	0.300	11/00	CONT	CONT	
	VAR	VARIOUS	0.000	1.104	Various	0.700	11/99	0.582	Various	CONT	CONT	
Ancillary Harware Development	WR	NUWC, Keyport Division	000:0	1.000	04/99	5.100	11/99/TBD	4.484	10/00	CONT	CONT	
	WR	NSWC, Dahlgren, VA	0000	1.000	11/98	1.100	11/99	1.200	10/00	CONT	CONT	
	VAR	VARIOUS	0.000	2.028	Various	0.513	11/99	0.411	10/00	CONT	CONT	
Systems Engineering	WR	NSWC, Dahlgren, VA	0.000	1.339	11/98	1.100	11/99	1.200	10/00	CONT	CONT	
LASM FC Hardware/Software Dev	SS/CPFF	SS/CPFF LM/Baltimore, MD	0.000	0.000		0.000		5.000	11/00	CONT	CONT	
	SS/CPFF	SS/CPFF Contractor TBD	0.000	0.000		0.000		7.000	11/00	CONT	CONT	
LASM FC Systems Engineering	SS/CPFF	SS/CPFF JHU/APL	0000	0.000		0.000		1.300	11/00	CONT	CONT	
	SS/CPFF	SS/CPFF Contractor TBD	000.0	0.000		0.000		1.200	11/00	CONT	CONT	
	WR	NSWC, Dahlgren, VA	0.000	0.000		0.000		1.500	10/00	CONT	CONT	
	VAR	VARIOUS	0.000	0.000		0.000		1.000	11/00	CONT	CONT	
	VAR	VARIOUS	0.000	0.000		0.000		2.000	11/00	CONT	CONT	
Award Fees			0000	0.396	02/00	1.300	TBD	1.565	TBD	CONT	CONT	
Subtotal Product Development			0.000	17.490		24.764		45.427	10/00	CONT	CONT	
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support	VAR	VARIOUS	0.000	0.670	11/98	1.500	Various	2.000	Various	CONT	CONT	
Configuration Management												
Technical Data												
GFE			000	0.00		001		000		FINCO	TINOS	
Subtotal Support			0.000	0.6/0		1.500		2.000		200		
Remarks:												

R-1 SHOPPING LIST - Item No. 74 - 15 of 74 - 25

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 15 of 25)

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									DATE:				
Exhibit R-3 Cost Analysis (page 2)	te 2)				:						February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	Ł		PROGRAM ELEMENT	LEMENT	Tob/1060	070EN	PROJECT N/	PROJECT NAME AND NUMBER	BER				
KDI &E, N/BA-4			can weap	ous system	Gun Weapons Systems Technologison	NICE /C	Navai Files C	ystelli	(252)				
Cost Categories (Tailor to WBS, or System/Item	Contract Method			Total PY s	FY 99	FY 99 Award	FY 00	FY 00 Award	FY 01 Cost	FY 01 Award Data	Cost to	Total	Target Value
Requirements)	a lybe	NSWC/PT HITE CA		000	S	01/99	0.500	11/99	1.500	10/00	CONT	CONT	
Operational Test & Evaluation			13										
Tooling													
GEE													
Subtotal T&E				0.000	0.300		0.500		1.500	i	CONT	CONT	
Remarks:													
Contractor Engineering Support													
Government Engineering Support													
Program Management Support											11100	i d	
Travel	2	NAVSEA HQ		0.000	0.100	Various	0.100	Various	0.100	Various		NO.	
Labor (Research Personnel)													
Overhead											!	!	
Subtotal Management				0.000	0.100		0.100		0.100		CONT	CONT	
Remarks:										,			
Total Cost				0.000	18.560		26.864		49.027		CONT	CONT	
Remarks:					3								
				R-1 SHOF	R-1 SHOPPING LIST - Item No. 74 - 16 of 74 - 25	- Item No. 7	4 - 16 of 74	- 25		Exhibit	Exhibit R-3. Project Cost Analysis	st Analysis	

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 16 of 25)

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EXHIBI	EXHIBIT R-2a, RDT&E Project Justification	Project Just	tification				DATE:			
i	•	•						Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM EL	EMENT NAME	ELEMENT NAME AND NUMBER		PROJECT NA	PROJECT NAME AND NUMBER	BER			
RDT&E, N/BA-4	0603795N G	Sun Weapon	Gun Weapons Systems Tech	Tech		Lai	Land Attack Standard Missile K2409	dard Missile	K2409	
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004		FY 2005 Cost to Complete Total Cost	Total Cost
Droitort Coet		7367	24,747	22 239	19.120	7.785	0.000	0.000	0.000	80.928
DDTRE Articles Ott			œ	ĸ	2					15
AD I AE ARICIES LALY			•	,						J

effects against ground targets. Testing will include ground and flight tests to demonstrate safety, range, accuracy, jamming resistance, lethality, and reliability. RDT&E,N articles include inert operational missiles (IOMs) and a Dynamic Inert Missile (DIM) for ground testing and complete all up rounds (AURs) for flight testing. A. (U) Mission Description and Budget Item Justification: This project funds the Land Attack Standard Missile (LASM) (SM-4) program to provide responsive, all-weather, around-the-clock Naval Surface Fire Support to Ground Combat Elements beyond that which is available from gun systems. Major efforts involved are systems integration and testing. Systems integration consists of integrating GPS/INS guidance, height of burst (HOB) sensor(s), warhead modifications, and new flight software to optimize

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

- 1. (U) FY 1999 ACCOMPLISHMENTS:
- (U) (\$ 1.488) Initiated and developed ORD, TEMP, APB, Program Protection Plan, Acquisition Strategy, Plans, and other program management documents; planned PDRR and E&MD efforts.
 - (U) (\$ 5.879) Initiated Program Definition and Risk Reduction (PDRR): a series of trade studies, engineering analyses, assessments, and tests which will result in the definition of a preliminary design to assure a low risk entry into E&MD.

- FY 2000 PLAN:
 (\$ 0.700) Develop programmatic documentation and make other preparations for Milestone II decision meeting and award of E&MD contract.
 (\$ 4.000) Complete PDRR. Continue to define missile system technical requirements; analyze, test, and select GPS/INS, HOB sensor(s), warhead mods, and other component hardware and software; develop ITEP, SRD, TLR, PIPS, CIPS, ICDs, and other preliminary drawings.
 - (U) (\$13.467) Integrate hardware and software, develop preliminary missile design, and apply results of early testing to verify and/or refine preliminary design. (U) (\$ 3.550) Procure, test, and evaluate hardware, and plan for next round of testing (including flight tests).
- (U) FY 2001 PLAN: က်
- (U) (\$16.609) Continue round level integration as well as integration of missile with ship systems, and continue to use testing results to refine preliminary design.
- (U) (\$ 5.630) Continue ground testing and conduct engineering flight tests, evaluate results, finalize plans for developmental flight testing, and initiate planning for and procurement of production representative hardware for TECHEVAL and OPEVAL.

R-1 SHOPPING LIST - Item No. 74 - 17 of 74 - 25

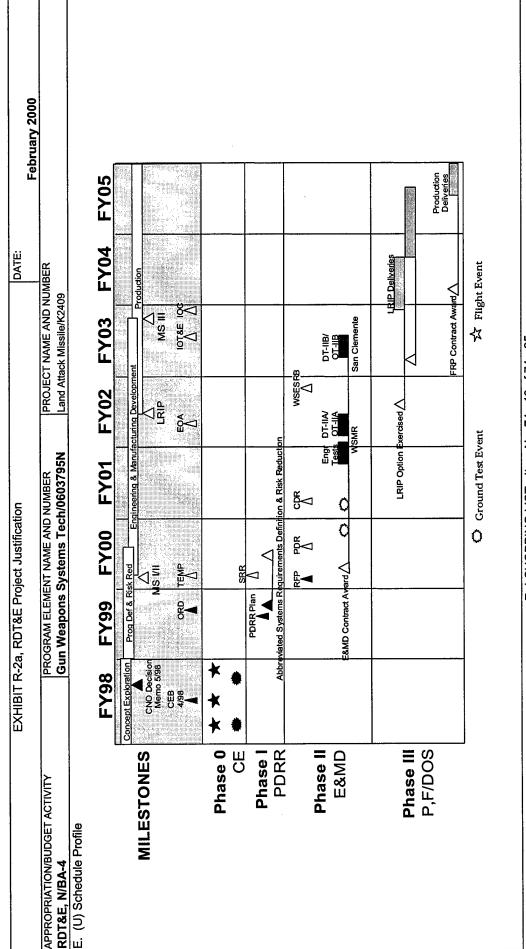
(Exhibit R-2a, page 17 of 25) Exhibit R-2a, RDT&E Project Justification

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	EXHIBIT R-2a, RDT&E Project Justification	RDT&E Pro	oject Justific	cation			Ω	DATE:	February 2000	, 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-4	PROC 0603	PROGRAM ELEME 0603795N Gun	PROGRAM ELEMENT NAME AND NUMBER 0603795N Gun Weapons Systems T	ENT NAME AND NUMBER Weapons Systems Tech		PROJECT NAME AND NUMBER Land Attack Standard Missile K	E AND NUMBE	R K2409		
B. (U) Other Program Funding Summary:	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Complete	Total Cost
WPN 223700 O&MN			0 0	0 0	0.945	13.772	31.324		304.000 115.000	394.582 126.615
(U) Related RDT&E,N: N/A										
C. (U) Acquisition Strategy: Pre E&MD efforts will be conducted under level of effort contracts with the SM-2 Design Agent (DA). A cost-plus E&MD completion contract will be awarded to the DA to develop and integrate the necessary changes and to support DT/OT of LASM. Existing GFE SM-2 Block II/II missiles will be refurbished and converted into Land Attack Missiles (SM-4). Refurbishment and conversions are "turn key" and do not involve separate installations.	efforts will be integrate the rad-4). Refurbish	conducted necessary (ment and c		of effort cor nd to suppor are "turn ke	ntracts with art DT/OT of y" and do no	the SM-2 De LASM. Exis xt involve sep	sign Agent (sting GFE S aarate install	DA). A cost M-2 Block II ations.	-plus E&MD α////////////////////////////////////	under level of effort contracts with the SM-2 Design Agent (DA). A cost-plus E&MD completion contract will shanges and to support DT/OT of LASM. Existing GFE SM-2 Block II/III missiles will be refurbished and onversions are "turn key" and do not involve separate installations.

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Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 18 of 25)



R-1 SHOPPING LIST - Item No. 74 - 19 of 74 - 25

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 19 of 25)

UNCLASSIFIED

									DATE				
Exhibit R-3 Cost Analysis (page 1)	e 1)										February 2000	0	
APPROPRIATION/BUDGET ACTIVITY	\ <u></u>	PRC	PROGRAM ELEMENT	ENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E. N/BA-4		090	0603795N Gun Weapons Systems Tech	Weapons	Systems Te	ich	Land Attack St	Land Attack Standard Missile	K2409				
Cost Categories	Contract	Performing		Total		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item	Method	Activity &		PYs	FY 99	Award	FY 00		<u> </u>	Award	Cost to	Total	Target Value
Requirements)	& Type	Location)	Cost	Cost	Date		Date	Cost	Date	Complete	Cost	of Contract
Primary Hardware Development													
Ancillary Hardware Development	WR	NSWC/Dahlgren, VA	¥	0.700	0.525	66/40	1.600	12/99	1.400	10/00	0.600	4.825	
	WR	VAR		0.110	0.150	66/20	0.415	12/99	0.585	10/00	0.525	1.785	
Systems Engineering	WR	VAR		0.300	1.600	66/20	2.200	12/99	0.900	10/00	1.650	6.650	
	SS/CPAF Raytheon	Raytheon											
		Missile		0.819	3.353	66/20	14.400	02/00	13.978	10/00	15.736	48.286	52.470
Award Fees				0.071	0.276	66/20	1.252	02/00	1.216	10/00	1.369	4.184	
Subtotal Product Development				2.000	5.904		19.867		18.079		19.880	65.730	
Remarks:													

Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support	WR	VARIOUS	0.000	0.090	66/20	0.220	12/99	0.200	10/00	0.240	0.750	
Configuration Management	WR	VARIOUS	0.000	0.135	02/99	0.330	12/99	0.300	10/00	0.360	1.125	
Technical Data												
111111111111111111111111111111111111111												
Subtotal Support			0.000	0.225		0.550		0.500		0.600	1.875	

Remarks:

R-1 SHOPPING LIST - Item No. 74 - 20 of 74 - 25

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 20 of 25)

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								DATE:				
Exhibit R-3 Cost Analysis (page 2)	te 2)									February 2000	00	
APPROPRIATION/BUDGET ACTIVITY	, L	PROGRAM ELEMENT				PROJECT NAME AND NUMBER	ME AND NUM	BER				
RDT&E, N/BA-4		0603795N Gun Weapons	Veapons Sys	Systems Tech		Naval Surface Fire Support	Fire Support	K2409				
Cost Categories	Contract	Performing					FY 00	7	FY 01	Cost to	Total	Target Value
(Tailor to WBS, or System/Item Requirements)	& Type	Activity & Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	of Contract
Developmental Test &	WR		.700	8		220	12/99	1.700	10/00	1.200	3.850	
Evaluation		White Sands										
	WR	VAR	0.000	0.095	02/99	0.140	12/99	0.460	10/00	0.330	1.025	
Operational Test & Evaluation	WR	NAWC/AD, Pt Mugu, CA	0.000	0.050	07/99	0.150	12/99	0.200	10/00	2.800	3.200	
	WR	VAR	0.000	0:030	66/20	090'0	12/99	0.090	10/00	0.195	0.375	
Tooling												
GFE												
Subtotal T&E			0.700	0.175		0.600		2.450		4.525	8.450	
Remarks:											,	
Contractor Engineering Support	VAR	VAR	0.000	0.425	66/20	0.550	12/99	0.850	10/00	1.175	3.000	
Government Engineering Support				3,0	Contro	0.400	70,07	000	40,00	3030	4 620	
Program Management Support	VAR	VAR	0.000	0.613	66//0	001.0	66/71	0.300	00/01	670.0	1.030	
Travel	6	NAVSEA HQ	0.000	0.025	VAR	0.050	VAR	090'0	VAR	0.100	0.235	
Labor (Research Personnel)												
Overhead								,		300,	0.20	
Subtotal Management			0.000	1.063		0.700		1.210		1.900	4.873	
Remarks:												•
			0 700	7367		24 747		22 230		26 905	80.928	
Total Cost			2.700	/36/		71.717		22.239		20.903	00.350	
Remarks:												
			D 1 CHOL	TOLI CIVICE	D 4 CUNDDINIC 1 IST How No 74 - 24 of 74 - 25	- 21 of 74 -	25					

R-1 SHOPPING LIST - Item No. 74 - 21 of 74 - 25

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 21 of 25)

UNCLASSIFIED

	-2a, RDT&E	EXHIBIT R-2a, RDT&E Project Justification	ification				DATE:			
								Febr	February 2000	
APPROPRIATION/BUDGET ACTIVITY P	PROGRAM ELI	ELEMENT NAME AND NUMBER	AND NUMBE		PROJECT NAME AND NUMBER	WE AND NUM!	3ER			
RDT&E, N 0	0603795N G	Gun Weapons Systems Tech	s Systems		Continuous Processor K2771	cessor K27	71			
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004		FY 2005 Cost to Complete Total Cost	Total Cost
Project Cost		0.000	5.967	0.000	0.000	0.000	0.000	0.000	0.000	5.967
RDT&E Articles Qtv										

supporting the feasibility of this process to significantly reduce the cost to produce energetics, to reduce waste and pollution during manufacturing, improve the safety of operations and to improve product quality and reproducibility. The efforts under this project will be directed towards scale-up of the continuous processing technology, demonstration of the benefits, and the technology transition to industry for the manufacture of gun propellants and other energetics. A. (U) Mission Description and Budget Item Justification: Development of technology to manufacture propellants and explosives using continuous processing methods will result in lower costs for the energetic materials used in Naval Guns. Prior investments in this technology have established the fundamental science and engineering

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

- 1. (U) FY 1999 ACCOMPLISHMENTS: N/A
- 2. (U) FY 2000 PLAN:
- (U) (\$5.967) Initiate process definition and design for a flexible capability to scale-up continuous processing technology. This includes hazards and environmental analyses, design and acquisition of specific process equipment needed to demonstrate gun propellant manufacture, and processing technology development and support.
- 3. (U) FY 2001 PLAN: N/A

R-1 SHOPPING LIST - Item No. 74 - 22 of 74 - 25

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 22 of 25)

UNCLASSIFIED

LIBIHX3	EXHIBIT R-2a, RDT&E Project Justification	DATE	E February 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E, N	PROGRAM ELEMENT NAME AND NUMBER 0603795N Gun Weapons Systems Tech	PROJECT NAME AND NUMBER Continuous Processor K2771	
B. (U) Other Program Funding Summary:	Not Applicable		
C. (U) Acquisition Strategy: Not Applicable			
D. (U) Schedule Profile: Not Applicable			

R-1 SHOPPING LIST - Item No. 74 - 23 of 74 - 25

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, page 23 of 25)

UNCLASSIFIED

Exhibit R-3 Cost Analysis (page 1)	=			:				DATE:		February 2000	0(
APPROPRIATION/BUDGET ACTIVITY	\ \ \	PROGRAM ELEMENT	ELEMENT			PROJECT NA	PROJECT NAME AND NUMBER	BER				
RDT&E, N		06037951	0603795N Gun Weapo	ons Systems Tech	s Tech	Continuous Processor		K2771				
Cost Categories C		Performing	Total		FY 99		FY 00		FY 01			
(Tailor to WBS, or System/Item M	Method Ac	Activity &	PYs	FY 99	Award	<u>۲</u> 80		_	Award		Total	Target Value
Requirements)		ocation	Cost	Cost	Date	Cost			Date		Cost	of Contract
velopment		NSWC IHDIV	0000	000'0	A/N	3.435	01/00	0.000	N/A	0.000	3.435	
pment											0.000	
Systems Engineering											0.000	
Licenses											0000	
aujoment/tooling	C/FP V8	Various/TBD	0.000	0000	Α/N	2.532	Various	000'0	N/A		2.532	
											0.000	
Award Fees											0000	
Subtotal Product Development			0.000	0.000		5.967		0.000		0.000	5.967	
Remarks:												
Development Support Equipment											0.000	
Software Development	-										0.000	
Training Development	_										0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0000		0.000		0.000	0.000	
Remarks: Categories do not apply												

R-1 SHOPPING LIST - Item No. 74 - 24 of 74 - 25

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 24 of 25)

UNCLASSIFIED

Exhibit R-3 Cost Analysis (page 2)	2)	A STATE OF THE STA							DATE:		February 2000	00	
APPROPRIATION/BUDGET ACTIVITY		PRO	PROGRAM ELEMENT	MENT			PROJECT N.	PROJECT NAME AND NUMBER	MBER				
RDT&E, N		090	0603795N Gun Weapo	n Weapon	ons Systems Tech	; Tech	Continuous Processor	Processor	K2771				
Γ		Performing	ピ	Total		FY 99		FY 00		FY 01			
or System/Item	Method /	Activity &	<u>و</u> 5	PY s Cost	FY 99 Cost	Award Date	FY 00 Cost	Award	FY 01 Cost	Award Date	Cost to Complete	Total Cost	Target Value of Contract
Test & Evaluation	1												
Operational Test & Evaluation												0.000	
Tooling												0.000	
GFE												0.000	
Subtotal T&E				0.000	0.000		0.000		0.000		0.000	0.000	
Contractor Engineering Contract												0.000	
Contractor Engineering Support												0.000	
Program Management Support												0.000	
Travel												0.000	
Labor (Research Personnel)												0.000	
Overhead												0.000	
Subtotal Management				0.000	0.000		0000		0.000		0.000	0.000	
Remarks:													
Total Coet				0.000	0.000		2.967		0.000		0.000	5.967	
Remarks:						_							
				D-1 SHOP	TOI LONIG	. Itam No	P.1 SHODDING LIST - Ifom No. 74 - 25 of 74 - 25	. 25					

R-1 SHOPPING LIST - Item No. 74 - 25 of 74 - 25

Exhibit R-3, Project Cost Analysis (Exhibit R-3, page 25 of 25)

EXHIBIT R-2, FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 2000

PROGRAM ELEMENT: 0603800N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: JOINT STRIKE FIGHTER (JSF) PROGRAM

(U) COST (Dollars in thousands)

€ 1	,742,506	
TOTAL PROGRAM	1,74;	
TO COMPLETE	0	
FY 2005 ESTIMATE	0	
FY 2004 ESTIMATE	0	
FY 2003 ESTIMATE	0	
FY 2002 ESTIMATE	0	
FY 2001 ESTIMATE	131,566	
FY 2000 BUDGET	239,907	4
FY 1999 ACTUAL	471,290	Quantity of RDT&E Articles
PROJECT NUMBER TITLE	JSF	Quantity of RI

validated and affordable joint operational requirements, and demonstrating cost leveraging technologies and concepts to lower risk prior to entering Engineering and Manufacturing Demonstration (E&MD) in FY 2001. This is a joint program with no executive service. Navy and Air Force each provide approximately equal shares of annual funding for the program. The United Kingdom is a collaborative partner in this phase of the program and several other countries also (U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike fighter aircraft for the USN, USMC, USAF and allies. Current program emphasis is on facilitating the evolution of fully

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it integrates hardware for test related to specific ship or aircraft applications.

R-1 Item No. 75

Exhibit R-2, RDT&E Budget Item Justification (Exhibit R-2, Page 1 of 12)

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

PROGRAM ELEMENT: 0603800N

PROGRAM ELEMENT TITLE: JOINT STRIKE FIGHTER (JSF) PROGRAM

(U) COST (Dollars in thousands)

BUDGET ACTIVITY: 4

TOTAL PROGRAM	1,742,506
TO COMPLETE	0
FY 2005 ESTIMATE	0
FY 2004 ESTIMATE	0
FY 2003 ESTIMATE	0
FY 2002 ESTIMATE	0
FY 2001 ESTIMATE	131,566
FY 2000 BUDGET	239,907
FY 1999 ACTUAL	471,290
PROJECT NUMBER TITLE	JSF

Quantity of RDT&E Articles

validated and affordable joint operational requirements, and demonstrating cost leveraging technologies and concepts to lower risk prior to entering Engineering and Manufacturing Demonstration (E&MD) in FY 2001. This is a joint program with no executive service. Navy and Air Force each provide approximately equal shares of annual funding for the program. The United Kingdom is a collaborative partner in this phase of the program and several other countries also common family of next generation strike fighter aircraft for the USN, USMC, USAF and allies. Current program emphasis is on facilitating the evolution of fully (U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Joint Strike Fighter (JSF) Program will develop and field an affordable, highly

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

- 1. (U) FY 1999 ACCOMPLISHMENTS: (Breakout reflects Navy, Air Force, United Kingdom, Multi-Lateral, Canadian and Italian funding)
- (U) (\$762,415) Continued Concept Demonstration efforts by Boeing, Lockheed Martin and Pratt & Whitney including company unique technology
 demonstrations, completed final design and continued build of Concept Demonstrator Aircraft (CDA) and continued concept refinement for a tri-service family of
- (U) (\$ 40,153) Continued the Alternate Engine Program.
- Demonstration Phase in the areas of system test, air vehicle analysis and integration, advanced cost estimating, survivability, integrated flight and propulsion producibility, propulsion and mission systems. Completed approximately half of the demonstrations. Continued systems engineering support for the Concept • (U) (\$141,580) Continued technology maturation demonstrations and assessments in the areas of airframe, flight sy stems, manufacturing and control and carrier suitability.

R-1 Item No. 75

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, Page 2 of 12)

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603800N
PROGRAM ELEMENT TITLE: JOINT STRIKE FIGHTER (JSF) PROGRAM

• (U) (\$ 9,341) Continued technology maturation demonstrations and assessments in the areas of supportability and training and prognostics and heal th management

- COPT to facilitate the Services' joint requirements definition. Continued requirements analysis in support of final requirements document. Continued modeling and simulation support testing, training, and refinement of concept of operations for the weapons system (simulation based acquisition). • (U) (\$ 13,307) Continued modeling and simulation activities to support strike warfare mission area analysis and requirements analysis efforts including
- (U) (\$ 15,227) Continued mission support, including program office functions.
- (U) (\$982,023) Total
- 2. (U) FY 2000 PLAN: (Breakout reflects Navy, Air Force, United Kingdom, Multi-Lateral and Canadian funding)
- (U) (\$394,892) Continue Concept Demonstration efforts by Boeing, Lockheed Martin and Pratt & Whitney including ground and flight demonstrations, areas of technology maturation and concept refinement for a tri-service family of aircraft. Request proposals from contractors for their designs and E&MD
- (U) (\$ 26,190) Continue the Alternate Engine Program.
- (U) (\$ 68,554) Continue technology maturation demonstrations and assessments in the areas of airframe, flight systems, manufacturing and producibility, propulsion and mission systems. Continue systems engineering support for the Concept Demonstration Phase in the areas of system test, air vehicle analysis and integration, advanced cost estimating, survivability, integrated flight and propulsion control and carrier suitability.
- (U) (\$ 8,853) Continue technology maturation demonstrations and assessments in the area of autonomic logistics (formerly supportability and training) and complete prognostics and health management technology maturation demonstrations and assessments.
- (U) (\$ 9,030) Continue modeling and simulation activities to support strike warfare mission area analysis and requirements analysis efforts including COPT to facilitate the Services' joint requirements definition. Support analysis as required for final Joint Operational Requirements Document (JORD) coordination and signature. Continue modeling and simulation support testing, training, and refinement of concept of operations for the weapons system (simulation based acquisition)
- (U) (\$ 15,377) Continue mission support, including program office functions.
- (U) (\$522,896) Total

R-1 Item No. 75

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, Page 3 of 12)

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603800N

PROGRAM ELEMENT TITLE: JOINT STRIKE FIGHTER (JSF) PROGRAM

- 3. (U) FY 2001 PLAN: (Breakout reflects Navy, Air Force, UK, Multi-Lateral and Canadian funding)
- (U) (\$110,552) Complete Concept Demonstration efforts by Boeing, Lockheed Martin and Pratt & Whitney including ground and flight demonstrations, areas of technology maturation and concept refinement for a tri-service family of aircraft.
- (U) (\$ 94,000) Complete the Alternate Engine Phase IIIA effort (Common Core Design Trade Studies) in this Program Element. (Alternate Engine Development Program will continue in JSF E&MD, Program Elements 0604800N and 0604800F.)
- producibility, mission systems, propulsion and autonomic logistics. Complete systems engineering support for the Concept Demonstration Phase in the areas of system test, air vehicle analysis and integration, advanced cost estimating, survivability, integrated flight and propulsion control and carrier suitability. Complete analyses required for Milestone II. Commence and complete source selection evaluation to down-select for final design. • (U) (\$ 38,137) Complete technology maturation demonstrations and assessments in the areas of airframe, flight systems, manufacturing and
- (U) (\$ 5,000) Complete modeling and simulation activities to support required Milestone II analyses. Complete modeling and simulation support testing, training, and refinement of concept of operations for the weapons system (simulation based acquisition).
- (U) (\$ 15,715) Complete mission support, including program office functions.
- (U) (\$263,404) Total

EV 2001	\$ 25,762		+105,804	\$131,566
EV 2000	\$241,238	241,238	- 1,331	\$239,907
FV 1999	\$468,509	\$470,902	+ 2,781	\$471,290
(U) B. PROGRAM CHANGE SUMMARY: (Dollars in thousands)	(U) FY 2000 President's Budget:	(U) Appropriated Value:	(U) Adjustments from President's Budget:	(U) FY 2001 President's Budget Submit:

R-1 Item No. 75

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, Page 4 of 12)

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

PROGRAM ELEMENT: 0603800N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: JOINT STRIKE FIGHTER (JSF) PROGRAM

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1999 net increase of +\$2,781 thousand reflects an increase to preclude reduction of Boeing and Lockheed Martin CDP contracts funding increments, an increase for Contract Advisory and Assistance Services and minor pricing adjustments. FY 2000 decrease of -\$1,331 thousand reflects an across-the-board congressional rescission. FY 2001 net increase of \$105,804 thousand reflects a transfer of funds from E&MD to Concept Demonstration Program (CDP) to cover alternate engine program and CDP requirements and minor pricing adjustments.

(U) Schedule: Completion of the Operational Requirements Document (ORD) has moved from December 1999 to March 2000 due to Joint Requirements Oversight Council (JROC) scheduling problems.

(U) Technical: Not applicable.

(U) C. OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands) This is a joint program with no executive service. The United Kingdom is a collaborative partner in this phase of the program and several other countries also participate.

TOTAL PROGRAM	\$1,695,723	\$118,006	\$200,291	\$32,100	\$10,600	\$10,000
TO COMPLETE	0	0	0	0	0	0
FY 2005 ESTIMATE	0	0	0	0	0	0
FY 2004 ESTIMATE	0	0	0	0	0	0
FY 2003 ESTIMATE	0	0	0	0	0	0
FY 2002 ESTIMATE	0	0	0	0	0	0
FY 2001 ESTIMATE	\$129,538	0	0	\$1,700	\$600	0
FY 2000 BUDGET	\$249,088	0	\$26,101	\$5,100	\$2,700	0
FY 1999 ACTUAL	\$456,137	0	\$34,096	\$7,500	\$3,000	\$10,000
Appn	(U) KUI KE 0603800F	(U) KUI KE 0603800E	(U) UNITED KINGDOM	(U) MULII- LATERAL	(U) CANADA	(U) ITALY

(U) RELATED RDT&E:

Milestone II for E&MD of the Joint Strike Fighter (JSF) is planned in FY 2001.

R-1 Item No. 75

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, Page 5 of 12)

DATE: February 2000

EXHIBIT R-2a, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

PROGRAM ELEMENT TITLE: JOINT STRIKE FIGHTER (JSF) PROGRAM

PROGRAM ELEMENT: 0603800N

BUDGET ACTIVITY: 4

TOTAL PROGRAM	TBD	TBD
TO COMPLETE	TBD	TBD
FY 2005 ESTIMATE	\$1,631,937	\$1,639,111
FY 2004 ESTIMATE	\$1,853,319	\$1,859,938
FY 2003 ESTIMATE	\$1,927,241	\$1,932,487
FY 2002 ESTIMATE	\$1,321,726	\$1,324,048
FY 2001 ESTIMATE	\$299,540	\$295,962
FY 2000 BUDGET	0	0
FY 1999 ACTUAL	0	0
	(U) RDT&E 0604800F	(U) KU I &E 0604800N

Excludes anticipated foreign funding which is TBD. December 1998 Selected Acquisition Report (SAR) reflected total E&MD cost estimate of \$19.8B (\$TY) funded by USN, USAF, and anticipated (but not finalized) foreign sources

Advanced Procurement for the Joint Strike Fighter (JSF) is planned in FY 2004. (U) RELATED PROCUREMENT FUNDING:

ral <u>iram</u>	твр	TBD
TOTAL PROGRAN	TE	里
TO COMPLETE	TBD	TBD
FY 2005 ESTIMATE	\$587,308	\$57,735
FY 2004 ESTIMATE	\$18,000	0
FY 2003 ESTIMATE	0	0
FY 2002 ESTIMATE	0	0
FY 2001 ESTIMATE	0	0
FY 2000 BUDGET	0	0
FY 1999 ACTUAL	0	0
	(U) USAF 0207142F	(U) APN-1 0204800N

D. ACQUISITION STRATEGY: 3

Program activities center around three distinct objectives that provide a sound foundation for the start of Engineering and Manufacturing Development

- (1) facilitating the Services' development of fully validated, affordable operational requirements;
- (2) lowering risk by investing in and demonstrating key leveraging technologies that lower the cost of development, production and ownership; and (3) demonstrating operational concepts.

requirements is provided to industry. They evolve their designs and provide cost data back to the warfighters. The warfighters evaluate trades and make decisions for the next iteration. This process produced the Services' first Joint Initial Requirements Document (JIRD I) in 1995 and the second and third iterations in 1997 and 1998, respectively. The Services continue to refine their requirements through this process, which will culminate in the Operational Early warfighter and technologist interaction is an essential aspect of the requirements definition process, and key to achieving JSF affordability goals. To an unprecedented degree the JSF Program is using cost-performance trades early, as an integral part of the weapon system development process. The Services are defining requirements through an iterative process, balancing weapon system capability against life cycle cost at every stage. Each iteration of Milestone support Requirements

R-1 Item No. 75

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, Page 6 of 12)

EXHIBIT R-2, FY 2001 RDT&E,N BUDGET PROJECT JUSTIFICATION SHEET

DATE: February 2000

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603800N

PROGRAM ELEMENT TITLE: JOINT STRIKE FIGHTER (JSF) PROGRAM

A sizable technology maturation effort is underway to reduce risk and life cycle cost (LCC) through technology maturation and demonstration. The primary demonstrations have been accomplished and others are in process to validate performance and life cycle cost impact to component, subsystem, and the total emphasis is on technologies which have been identified as high payoff contributors to affordability, supportability, survivability and lethality. Numerous

A multi-vear \$2.2 billion JSF Concept Demonstration effort commenced in November 1996 with competitive contract awards to Boeing and Lockheed Martin commonality and modularity, STOVL hover and transition, and low speed handling qualities of their respective weapon system concepts. Pratt and Whitney is providing propulsion hardware and engineering support for both Boeing's and Lockheed Martin's on-going JSF Concept Demonstration efforts. The JSF demonstrators, and continue refinement of their ultimate delivered weapon system concepts. Specifically, Boeing and Lockheed Martin will demonstrate for Concept Demonstration Programs. These competing contractors will build and fly concept demonstrator aircraft, conduct concept unique ground Concept Demonstration approach has several benefits:

(1) maintains the competitive environment prior to E&MD and provides for two different STOVL approaches and two different aerodynamic configurations (2) demonstrates the viability of a multi-service family of variants with high commonality and modularity between CTOL, CV, and STOVL variants

(3) provides affordable and low risk technology transition to the JSF E&MD phase.

The JSF Alternate Engine Program, with General Electric, continues development of an alternate engine for production.

Downselect to a single prime weapon system contractor for E&MD and Milestone II are planned in FY 2001. JSF production is planned to begin in FY 2005.

(U) E. SCHEDULE PROFILE:

Dec 94 Commenced Concept Development Phase

Mar 96 Released RFP for Concept Demonstration Efforts

May 96 Designated a joint, DOD, Acquisition Category ID Program by USD(A&T)
Nov 96 Competitively Awarded Concept Demonstration Contracts to Boeing and Lockheed Martin

Mar 00 Complete Operational Requirements Document (ORD)

Mar 01 Milestone II for JSF E&MD

R-1 Item No. 75

Exhibit R-2a, RDT&E Project Justification (Exhibit R-2a, Page 7 of 12)

										Target	Value of	Contract																									R-3, RDT&E Cost Analysis (Exhibit R-3, Page 8 of 12)
ry 2000	D2209	2025	JA-01	¥	ML	CAN	ITALY	JSF			Total	Cost		11,467	11,467		3,432		32,770		23,708		21,358		28,311		1,121	8,322	115,590		16,416	11,200	15,539	43,155		2,522	Exhibit R-3, RDT&E Cost Analysis (Exhibit R-3, Page 8 of 12)
DATE: February 2000	UMBER:	UMBER:	UMBER:	UMBER:	UMBER:	UMBER:	UMBER:	ILE:			Cost To	Complete																									Exhili
	PROJECT NUMBER:	PROJECT NUMBER:	PROJECT NUMBER:	PROJECT NUMBER:	PROJECT NUMBER:	PROJECT NUMBER:	PROJECT NUMBER:	PROJECT TITLE:		FY 2001	Award	<u>Date</u>																									
											FY 2001	Cost																									
ì								SF) PROGRAM		FY 2000	Award	Date																									
YSIS				SDOM	RAL			JOINT STRIKE FIGHTER (JSF) PROGRAM	Prior.		FY 2000	Cost																								1	K-1 Item No. /3
EXHIBIT R-3. FY 2001 RDT&E.N COST ANALYSIS	NSN	USAF	DARPA	UNITED KINGDOM	MULTI-LATERAL	CANADA	ITALY	JOINT STRIP	t in FY 1993 and	FY 1999	Award	Date																									K-1 Reg
2001 RDT&E	0603800N	0603800F	0603800E	A/A	N/A	N/A	N/A		ls) No budge		FY 1999	Cost																									
HIBIT R-3, FY	,	Ë	Ë	Ë	E	Ë	Ë	AT TITLE:	3 (\$ in thousand	Total	FY 1998	& Prior		11.467	11,467	or to FY 2001)	3,432	FY 2001)	32,770		23,708		21,358		28,311		1,121	8.322	115,590		16,416	11,200	15,539	43,155		2,522	
X	PROGRAM ELEMENT:	PROGRAM ELEMENT:	PROGRAM ELEMENT:	PROGRAM ELEMENT:	PROGRAM ELEMENT:	PROGRAM ELEMENT:	PROGRAM ELEMENT:	PROGRAM ELEMENT TITLE:	B. (U) BUDGET ACQUISITION HISTORY AND PLANNING (\$ in thousands) No budget in FY 1993 and Prior	Performing	Activity &	Location	Strike Warfare Concept Studies (Total Prior to FY 2001)	Miscellaneous		Technology Maturation Concept Exploration Phase (Total Prior to FY 2001)	Fld. Activ.	Strike Warfare Systems Design Development (Total Prior to FY	Boeing	Seattle WA	McAir	St. Louis MO	Northrop	Pico Rivera CA	Lockheed	Fort Worth TX	Miscellaneous	Fld. Activ.			Lockheed	Boeing	Miscellaneous		TY 2001)	Fld. Activ.	
	?. 4	Υ. 4	<u>۲</u> : 3	Y: NA	Y: NA	Y: NA	Y: NA		CQUISITION HI	Contract	Method	& Type	cept Studies (To	Various	پ	tion Concept Ext	Various	tems Design Dev	C/CPFF		C/CPFF		C/CPFF		C/CPFF		Various	Various	بَ	or to FY 2001)	SS/CPFF	SS/CPFF	Various		t (Total Prior to	Various	
	BUDGET ACTIVITY:	BUDGET ACTIVITY:	BUDGET ACTIVITY:	BUDGET ACTIVITY: NA	BUDGET ACTIVITY: NA	BUDGET ACTIVITY: NA	BUDGET ACTIVITY: NA		B. (U) BUDGET A			Cost Categories: & PROJECT DEVELOPMENT	Strike Warfare Con		SUBTOTAL	Technology Matura		Strike Warfare Sys											SUBTOTAL	ASTOVL (Total Prior to FY 2001)				SUBTOTAL	Core Team Support (Total Prior to FY 2001)		

EXHIBIT R-3, FY 2001 RDT&E,N COST ANALYSIS

	Target	Value of	Contract		734,013	797,559	951,861	
2000		Total	Cost		734,013	797,559	914,471	
DATE: February 2000		Cost To	Complete					
	FY 2001	Award	Date		Oct 00	Oct 00	Nov 00	
		FY 2001	Cost		16,269	14,083	80,200	
	FY 2000	Award	Date		Oct 99	Oct 99	Nov 99	
SIS		FY 2000	Cost		156,761	153,931	84,200	
COST ANALYS	FY 1999	Award	Date	Ision efforts)	Oct 98	Oct 98	Nov 98	
01 RDT&E,N C		FY 1999	Cost	upporting propu	269,627	280,122	212,666	
EXHIBIT R-3, FY 2001 RDT&E,N COST ANALYSIS	Total	FY 1998	& Prior	monstrators and s	291,356	349,423	537,405	
Ä	Performing	Activity &	Location	Weapon System Concept Demonstrations (including flying demonstrators and supporting propulsion efforts)	Boeing *	Lockheed *	Pratt & Whitney *	West Palm Beach F
	Contract	Method	& Type	cept Demonstrati	C/CPFF	C/CPFF	SS/CPFF	
			Cost Categories;	Weapon System Cor				

*includes government managed equipment

Note: Consistent with recent Boeing and Lockheed Martin replans, annual funding increments reflect budgeted basic Concept Demonstration Program (CDP) efforts as well as areas of technology maturation. Boeing and Lockheed Martin Target Value of Contract reflects total contract funding requirements. Pratt and Whitney Total Value of Contract reflects award fees totaling \$35.1M, FY 1998 and prior, basic CDP efforts and technology maturation efforts in Propulsion and Prognostics and Health Management.

Award Fees										
SUBTOTAL		1,178,184	762,415		394,892		110,552		2,446,043	
Alternate Engine Program SS/CPFF	GE	7,000							7,000	
	Cincinnati OH								0	
SS/CPFF	GE.	61,794	40,153	Nov 98	26,190	Oct 99	94,000	Oct 00	222,137	225,137
SUBTOTAL		68,794	40,153		26,190		94,000		229,137	
Note: The Target Value includes Propulsion Technology Maturation efforts.	Propulsion Technology Mai	turation efforts.								
Technology Maturation										
Airframe										
SS/CPFF	McAir	19,240							19,240	
Various	Miscellaneous	1,985	8	Various	4	Varions	45	Various	2,168	
Various	Fld. Activ.	4,236	1.137	Nov 98	1,376	Nov 99	1,455	Nov 00	8,204	
SUBTOTAL		25,461	1,231		1,420		1,500		29,612	
Flight Systems										
C/CPFF	Lockheed	41,515	6,807	Nov 98	1,378	Nov 99			52,700	
C/CPFF	McAir	46,901	17,920	Nov 98	1,000	Nov 99			65,821	
Various	Miscellaneous	060'6	650	Nov 98	9	Nov 99	805	Various	10,605	
Various	Fld. Activ.	13,491	4.212	Nov 98	4.230	Nov 99	2.515	Nov 00	24,448	
SUBTOTAL		110,997	32,589		6,668		3,320		153,574	

R-1 Item No. 75

Exhibit R-3, RDT&E Cost Analysis (Exhibit R-3, Page 9 of 12)

UNCLASSIFIED EXHIBIT R-3, FY 2001 RDT&E,N COST ANALYSIS

DATE: February 2000

	Target Value of <u>Contract</u>					
}	Total Va	5,065	1,945	1,679 6 <u>,688</u> 28,277	5,448 5,681 30,000 3,000 26,777 3,640 8,200 2,800 14,797 50,020 150,363 45,173 41,903 1,517 1,517 3,681	3,000 26,092 <u>42,584</u> 181,369
· · · · · · · · · · · · · · · · · · ·	Cost To Complete					
i	FY 2001 Award <u>Date</u>			Various Nov 00	Various Nov 00	Various Nov 00
	FY 2001 <u>Cost</u>			60 1,470 1,530	50 3,000 3,000	2,389 <u>7,566</u> 9,955
	FY 2000 Award <u>Date</u>	Nov 99		Various Nov 99	Various Nov 99	Various Nov 99
,	FY 2000 <u>Cost</u>	009		75 <u>558</u> 1,233	48 <u>7,245</u> 7,245	2,139 7,383 9,522
	FY 1999 Award <u>Date</u>	Nov 98		Various Nov 98	Jan 99 Dec 98 Jul 99 Various Nov 98 Nov 98 Nov 98	Nov 98 Various Nov 98
	FY 1999 <u>Cost</u>	2,100		201 1,374 3,675	3,789 1,200 2,100 1,804 15,389 24,282 24,282 17,899 15,957	1,000 1,467 <u>5,352</u> 41,675
- 1021	Total FY 1998 & Prior	5,065	1,945	700 1,343 <u>3,286</u> 21,839	5,448 5,681 30,000 3,000 22,988 3,640 7,000 7,000 12,895 24,484 115,836 6,826 6,524 27,274 25,946 1,517 1,517 3,681	2,000 20,097 <u>22,283</u> 120,217
	Performing Activity & <u>Location</u>	Hughes Los Angeles CA Lockheed	General Res. Corp. Huntsville AL Scaled Composites	Lockneed Miscellaneous Fld. Activ.	Pratt/Whitney GE Pratt/Whitney GE Pratt/Whitney Pratt & Whitney Pratt & Whitney Pratt & Whitney Fratt & Whitney Fratt & Whitney Miscellaneous Fid. Activ. T1 Plano TX Lockheed McAir Raytheon Northrop/Grumman Boeing Lockheed Lockheed Hughes	Classified Miscellaneous Fid. Activ.
	Contract Method & Type	c/CPFF C/CPFF C/CPFF	C/CPFF	C/CPFF Various Various	C/CPFF SS/CPFF C/CPFF	Classified Various Various
	Cost Categories:	Manufacturing and Producibility C/CPFF C/CPFF		SUBTOTAL	Propulsion SUBTOTAL Mission Systems	SUBTOTAL

R-1 Item No. 75

Exhibit R-3, RDT&E Cost Analysis (Exhibit R-3, Page 10 of 12)

EXHIBIT R-3, FY 2001 RDT&E,N COST ANALYSIS

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2000
February
DATE:

Target	Contract																							
Total	Cost	33,706 132,478 166 184		1,500	9 576	5,549	11,330	21,226	58,281		46,719	36.145	82,864			2,500	38,524	41,024	3,742,894		33,701		32,631	66,332
Cost To	Complete																							
FY 2001 Award	Date	Various Nov 00					Various	Nov 00			Varions	Nov 00					Various				Jan 01		Various	
FV 2001	Cost	3,129 7,339 10,468					1,117	6.327	7,444		069	3.910	4,600				6,210	6,210	252,579		4,720		6.105	10,825
FY 2000	Date	Various Nov 99					Varions	Nov 99			Various	Nov 99					Various				Jan 00		Various	
2000	Cost	10,011 31,535 41 546					5,661	3,192	8,853		3,277	5.353	8,630				5,972	5,972	512,171		4,720		6,005	10,725
FY 1999	Date	Various Nov 98	ing).	Jan 99	9	Jan 99	Various	Nov 98			Various	Nov 98					Various				Jan 99		Various	
1000	Cost	8,573 28,635 37,708	ability and Train	1,500	250	750	2,281	4.030	9,311		5,033	7,874	12,907				5,709	5,709	971,155		4,720		6,148	10,868
Total	& Prior	11,993 64,969 76,067	адете	001,01	1000	4,799	2,271	7.677	32,673	Support	37,719	19,008	56,727			2,500	20,633	23,133	2,006,989		19,541		14,373	33,914
Performing	Location	Miscellaneous Fld. Activ.	Autonomic Logistics (formerlly Prognostics and Health Mar	Pratt & Whitney General Electric	Classified	Project 4	Miscellaneous	Fld. Activ.		Modeling, Simulation, Analysis, Threat, COPT and Core Support	Miscellaneous	Fld. Activ.			Institute for	Defense Anal	Fld. Activ.				ANSER	Arlington VA	Miscellaneous	
Contract	& Type	<u>Support</u> Various Various	(formerlly Proc	COPFF	C/CPFF	C/CPFF	Various			n, Analysis, Th	Various	Various	•			Grant	Various		relopment		SS/CPFF		Various	
	Cost Categories:	Systems Engineering Support Various Various	Autonomic Logistics						SUBTOTAL	Modeling, Simulation			SUBTOTAL	Mission Support				SUBTOTAL	Subtotal Project Development	SUPPORT (CS)				Subtotal Support

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Exhibit R-3, RDT&E Cost Analysis (Exhibit R-3, Page 11 of 12)

EXHIBIT R-3, FY 2001 RDT&E,N COST ANALYSIS

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Target Value of Contract												
Total <u>Cost</u>			3,809,226		1,742,506	1,695,723	118,006	200,291	32,100	10,600	10,000	3,809,226
Cost To Complete												
FY 2001 Award <u>Date</u>												
FY 2001 <u>Cost</u>			263,404		131,566	129,538			1,700	900	OI	263,404
FY 2000 Award <u>Date</u>												
FY 2000 Cost			522,896		239,907	249,088		26,101	5,100	2,700	Ol	522,896
FY 1999 Award <u>Date</u>												
FY 1999 <u>Cost</u>			982,023		471,290	456,137		34,096	7,500	3,000	10,000	982,023
Total FY 1998 & Prior			2,040,903		899,743	860,960	118,006	140,094	17,800	4,300	OI	2,040,903
Performing Activity & <u>Location</u>	above)											
Contract Method & Type	TION: (included	ď										
Cost Categories:	TEST AND EVALUATION: (included above)	MANAGEMENT: N/A	Total Cost	Funding Resources	0603800N	0603800F	0603800E	United Kingdom	Multi-Lateral	Canada	Italy	Total

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Exhibit R-3, RDT&E Cost Analysis (Exhibit R-3, Page 12 of 12)

				DATE February 2000
BUDC	BUDGET ACTIVITY			DE020E1M Non Lothal Warfara DEMAYA!
4 -	4 - Demonstration/Validation	ration//	/alidation	U6U383TIM NON-Letnal Warrare DEM/VAL
• •	\$ (<u>n)</u>	6810 2339	Active Denial Technology (ADT) – Evaluation, testing and target assessment of a HMMWV mos 66mm NL Munitions – Continued development and testing of 66mm vehicle launched munitions.	Active Denial Technology (ADT) – Evaluation, testing and target assessment of a HMMWV mounted directed energy system. 66mm NL Munitions – Continued development and testing of 66mm vehicle launched munitions.
•	\$ (<u>)</u> (<u>)</u>	52	UAV NL Payloads - Continued integration of non-let	UAV NL Payloads - Continued integration of non-lethal payloads into Unmanned Aerial Vehicles (UAVs).
٠	\$ (<u>D</u>)	1610	Bounding NL Munitions - Continued development ar	Bounding NL Munitions - Continued development and evaluation of NL bounding munitions to serve as an area denial/perimeter defense
•	\$ (n)	1006	system. Canister Launched Area Denial System (CLADS) –	System (CLADS) - Further development of NL munitions launched from a multi-platform mounted mine
•	\$ (L)	770	dispenser. Foams – Continued evaluation and testing of foams a	and testing of foams and nackaging delivery platforms.
•		875	Modular Crowd Control Munitions (MCCM) - Engin	Modular Crowd Control Munitions (MCCM) – Engineering & Manufacturing Development of a ground emplaced NL "claymore" mine and
•	\$ (L)	123	initial design and test of the vehicle mounting bracket. Joint Infergration Project (IIP) – Selected and tested of	itcle mounting bracket. — Selected and tested commercial products that will meet the Joint Services' requirement for specific NL
•	9 (0)	(71	Capability set items.	
9	(U)Total	33,895	1	
U) F	_	ned Prog	ram:	
• •	s (C)	1038	Execution oversignt and administration of the Joint INLW Program and technologies database expansion. Examination of MI We by Service warfighting Jahoratories for direct user feedback on various MI technologies.	Execution oversignt and administration of the Joint N.L.W. Program and technologies database expansion. Evaluation of NI We by Service warfighting laboratories for direct user feedback on various NI technologies and munitions
• •		705	Continue development of a modeling and simulation	Continue development of a modeling and simulation anlaysis tool for NLWs such as the Joint Conflict and Tactical Simulation (JCATS) model
			and performance effects data collection.	
•	\$ (D)	1215	Continue pursuit of new technology through open con	Continue pursuit of new technology through open competion of industry, academia and government lab sources for NL capabilities.
•	*	910	IND CIOWU Dispersar Cartruge – Engineering & main Launcher.	Infactualing Development of a 112 found of maintions for the 11205 Forming Cloudes
•	(£)	3000	Establish a technology innovation initiative to allow pursuit of new NL materials and technologies.	pursuit of new NL materials and technologies.
•	\$ (D)	883	Ground Vehicle Stopper (GVS) – Continue evaluatio stop/slow ground vehicles.	Ground Vehicle Stopper (GVS) – Continue evaluation of several proposed electrical vehicle stopper technologies that have potential to stop/slow ground vehicles.
•	\$ (n)	693	Vessel Stopper System (VSS) - Continue evaluation	- Continue evaluation of NL means of stopping maritime vessels and small, fast moving boats.
•		4328	Active Denial Technology (ADT) - Continue evaluat	Active Denial Technology (ADT) – Continue evaluation, testing and target assessment of a HMMWV mounted directed energy system.
• •	s s (2) (3)	2320 533	66mm NL Munitions – Complete testing of the 66mm Bounding NL Munitions – Continue development of	66mm NL Munitions – Complete testing of the 66mm vehicle launched munitions for crowd control and site security missions. Bounding NL Munitions – Continue development of NL bounding munitions to serve as an area dential/perimeter defense system.

	8	ROTRE BUDGET ITEM JUS	TIFICA	USTIFICATION SHEET (R-2 Exhabit)	HEET (R	-2 Exhi			DATE Fel	February 2000	00
BUDGET ACTIVITY 4 - Demonstration/Validation	ation/V	alidation		PE NI 0 0 0	PE NUMBER AND TITLE 0603851M Non-	PE NUMBER AND TITLE OG03851M Non-Lethal Warfare DEM/VAL	al Warfar	e DEM/V	'AL	E O	FPROJECT
	8	COST (In Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
C2319 Non Lethal Weapons Program	Veapons Pr	rogram	33895	26132	23580	23982	24390	26225	26752	Continuing	Continuing
Quantity of RDT&E Articles	DT&E Artiv	cles									
A. (U) Mission I. This project covers designed to stun, ii	S non-leth ncapacital nd militar	A. (U) Mission Description and Budget Item Justification: This project covers non-lethal weapon (NLW) systems which are those systems that by their design, do not inflict fatal or permanent injuries. Instead, these systems are designed to stun, incapacitate, or hinder movement of individuals, crowds, or equipment. The availability of NLWs allows commanders less than lethal options, particularly in urban warfare and military operations other than war, i.e., peacekeeping, humanitarian assistance and disaster relief, as well as special operations.	those systes, crowds, or cekeeping, h	ms that by th r equipment. wmanitarian	neir design, d The availat assistance a	lo not inflict oility of NLV nd disaster re	fatal or pern/s allows co	nanent injuri mmanders le as special o	es. Instead, ss than letha perations.	these system I options, pa	s are rticularly
(U) Justificati capabilities.	on for Br	(U) Justification for Budget Activity: This program is funded under Demonstration/Validation because it develops and integrates hardware for non-lethal weapons abilities.	ded under Do	emonstration	/Validation	because it de	velops and i	ntegrates ha	rdware for n	on-lethal we	apons
(U) FY 1999 Accomplishments: (U) \$ 2054 Exection (U) \$ 1240 Evalor (U) \$ 535 Contour (U) \$ 575 NL Contour (U) \$ 1324 Ground (U) \$ 1324 Ground (U) \$ 1324 Ground (U) \$ 1324 Ground (U) \$ 1324 Ground (U) \$ 1229 Areas (U) \$ 1229 Areas (U) \$ 1018 Portour (U) \$ 1229 Areas (U) \$ 1018 Portour (U) \$ 1229 Areas (U) \$ 1018 Portour (U) \$ 1229 Areas (U) \$ 1018 Portour (U) \$ 1229 Areas (U) \$	2054 1240 2802 535 575 3196 1324 1324 3786 1229 2038	ution oversight and admir uation of NLWs by Servic inued pursuit of new techn inued modeling and simul Crowd Dispersal Cartridge Icher. Istics – Demonstration and nes and continue work on and Vehicle Stopper – Cont nd vehicles. Iel Stopper System – Cont ies and Analysis – Medics nerging technologies for p Denial – Explored and de able Vehicle Immobilizer	tion of the Jo rfighting lab sy through of n of NLW in ontinued pro- nation of bic latabase. ed evaluation 1 NL casuali ole NL appli, ped technics	oint NLW Proratories for pen competition the Joint Coduction defin o-effects on to several I of NL mean. Ity data collecation. al NL solution Complete de Complet	ogram and t direct user; on of industrand Ta intion and ris internand ris proposed ele proposed ele s of stopping ction; strateg ms to anti-pe	echnologies feedback on y, academia actical Simul ik reduction ability and o ctrical vehicle maritime vegic planning; rasonnel land and testing o	database exp various NL t and governn ation (JCAT) of a NL roun perator safet le stopper tec ssels and sur human effec mines.	ansion. echnologies nent lab sou S) model. nd of muniti y in the infra chnologies tl all, fast mo its assessme	r and munitio rees for NL ons for the M asound and in hat have pote ving boats. rts; and tech to stop a vek	ons. 4203 40mm naudible aco ential to stop nical studies/	Grenade ustic slow analysis
		pounds) traveling at speeds up to 4.	to 45 mph.								

(Exhibit R.2, Page 2 of 6)

Budgett Item Justification

R-1 Line Item 76

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		RDT	RDT&E BUDGET ITEM JUSTIFICATION S	USTIFICATION SHEET (R-2 Exhibit)	DATE February 2000
B 4	вирсет АстіvітУ 4 - Demonstration/Validation	√ tration∧		PE NUMBER AND TITLE 0603851M Non-Lethal Warfare DEM/VAL	PROJECT C2319
•	\$ (n)	1670	aunched Area Denial	System (CLADS) - Continue development of NL munitions launched from a multi-platform mounted mine	nulti-platform mounted mine
•		1020	uispenset. Foams – Continue evaluation and testing of both rigid and slippery foams and packaging delivery platforms.	slippery foams and packaging delivery platforms.	ter and technical etudiae/analusis
•	₹ (∩)	10/0	Studies and Aliatysis – Medical and NL assuarty data context of emerging technologies for possible NL application.	and the casualty data concernon, strategic planning, number energy assessements, and technical strates, and is ossible NL application.	is, and todinical studios/analysis
•		2050	Concept Exploration Program (CEP) - Continue to explore and develop technical NL solutions to clear facilities and area dential for personnel.	and develop technical NL solutions to clear facility	ies and area dential for personnel.
•	(D) \$	54	Joint Integration Project (JIP) – Continue to select and test commercial products that will meet the Joint Services' requirement for specific NL canability sets items.	commercial products that will meet the Joint Servic	ces' requirement for specific NL
•	\$ (D)	2022	Develop and evaluate new RDT&E NLW technology initiatives.	ıtives.	
•	\$ (D)	961	Modular Crowd Control Munitions (MCCM) - Complete evaluation and testing of a vehicle mounted NL "claymore" mine.	evaluation and testing of a vehicle mounted NL "cle	aymore" mine.
•	(U) \$ Total \$	585 26.132	Running Gear Entaglement System (RGES) - Continue development of a NL entanglement capability to stop small, fact moving boats.	velopment of a NL entanglement capability to stop	small, fact moving boats.
=	The FW 2001 Blowned Become	0 70			
<u>)</u> •	JFI 2001 FIA	4111100 I 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	gram: Execution oversight and administration of the Joint NLW Program and technologies database.	Program and technologies database.	
•		540		or direct user feedback of various NL technologies	and munitions.
•	(C)	756	Initial modeling and simulation validation and verification	validation and verification of NLW in the Joint Conflict and Tactical Simulation (JCATS) model and	on (JCATS) model and
			performance effects data collection.		
•		1512	Continue pursuit of new technology through open competition of industry, academia and government lab sources for NL capabilities.	ion of industry, academia and government lab sour	ces for NL capabilities.
•	\$ (∩)	213	comin NL Municions — Complete Engineering & Manuact	uning Developinent of commit venicle famicined musi-	itions for clowd control and site
		001	security missions.	of the Ivint MI W Program	
• •	() (E)	3440	Service Frogram Support for oversignt and administration of the Joint INEW Frogram. Ground Vehicle Stonner (GVS) - Continue exalitation of several proposed electrical vehicle stopper technologies that have potential to stop/slow	of the John Tropies of Figure 1 weral proposed electrical vehicle stopper technolog	ries that have potential to stop/slow
		2	ground vehicles.	7	
•	\$ (D)	2376	Vessel Stopper System (VSS)- Continue evaluation of NL means of stopping maritime vessels	means of stopping maritime vessels	
•	_	4581	Active Denial Technology (ADT) - Continue evaluation, testing and target assessment of a HMMWV mounted directed energy system.	sting and target assessment of a HMMWV mounter	d directed energy system.
•	_	1098	Running Gear Entanglement System (RGES) – Continue development of a NL entanglement capability to stop small, fast moving boats.	evelopment of a NL entanglement capability to stor	o small, tast moving boats.
•		1979	Develop and evaluate new KD1 & E INLW technology initiatives.	allyes.	
•		1585	Foams - Continue evaluation and testing of both rigid and slippery toams and packaging delivery platforms.	slippery toams and packaging delivery platforms.	
•	\$ (D)	756	Studies and Analysis – Medical and NL casuality data collection; strategic planning; human effects assessments; and technical studies/analysis of emerging technologies for possible NL application.	ection; strategic planning; human effects assessmen	ts; and technical studies/analysis
			R-1 Lin	R-1 Line Item 76 Budg	Budget Item Justification
				(Exhil	(Exhibit R-2, Page 3 of 6)

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RDT&E BUDGET ITEM JU	USTIFICATION SHEET (R-2 Exhibit)	NO SH	EET (R-2	Exhib	it)	<u> </u>	DATE Febru	February 2000	
BUDGET ACTIVITY 4 - Demonstration/Validation		PE NUN 0603	PE NUMBER AND TITLE 0603851M Non-Lethal Warfare DEM/VAL	் n-Lethal	Warfare	DEM/VA		PROJECT C2319	T 1
rogram	Continue to explo	ore and deve	lop technical	NL solutio	ns for clear	ing facilities,	area denial to	- Continue to explore and develop technical NL solutions for clearing facilities, area denial to personnel, and to	
• (U) \$ 752 Joint Integration Program (JIP) – NI combility set items	Continue to sele	ct and test c	ommercial pro	oducts that	will meetin	g the Joint Se	rvices' require	- Continue to select and test commercial products that will meeting the Joint Services' requirement for specific	
artridge	- Complete Engineering & Manufacturing Development of a NL round of munitions for the M203 40mm	eering & Ma	nufacturing D	evelopmer	ıt of a NL re	ound of muni	ions for the M	.203 40mm	
Total \$ 23,580									
	FY 1999 34,512 (617) 33,895	29 7. 7. 95	FY 2000 23,277 2,855 26,132	EY 2. 2.	FY 2001 23,782 (202) 23,580				
 (U) Change Summary Explanation: (U) Funding: FY99 decrease of \$360K due to SBIR assessment and a \$257K due to minor affordabilty adjustment. FY2000 increase is due to a minor affordability adjustment. (U) Schedule: N/A (U) Technical: N/A 	sment and a \$25' ffordability adju	7K due to m stment. The	inor affordabi FY 2001 dec	Ity adjustm rease is du	ent. FY200 e to a mino	00 increase is r affordability	due to a \$3,00 adjustment.	10K	
C. (U) Other Program Funding Summary FY 1999	9 <u>FY 2000</u>	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To	Total Cost	
		0	0	0	0	0	0	3806	
(U) PAN,MC BLI 162800, Non-Lethals 984 (U) PMC BLI 237100, Operations Other Than 0 War (OOTW)	34 2000 0 1452	2700 1347	2079 1151	4136 1139	686	1148	Cont.	Cont.	
 (U) Related RDT&E: Not Applicable. (U) Schedule Profile: Not Applicable. 									
			;				:	į	
		R-1 Line Item 76	tem 76			Budge	Budget Item Justification		٦
						(Exhib	(Exhibit R-2, Page 4 of	4 of 6)	

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RDT&	E PROG	RDT&E PROGRAM ELEME	EMENT/PR	NT/PROJECT C	OST BF	EAKDO	COST BREAKDOWN (R-3)		DATE Fek	February 2000	
BUDGET ACTIVITY 4 - Demonstration/Validation	n/Validati	uo			PE NUMBER AND TITLE 0603851M Non-	AND TITLE M Non-L	ਮਸਸ Non-Lethal Warfare DEM/VAL	fare DEM	VAL	PROJECT C2319	Р ROJECT C2319
A. (U) <u>Project Cost Breakdown</u> Product Development Support and Management Total	eakdown nt			FY 1999 27055 6840 33895	FY 2000 19657 6475 26132	7 200 <u>0</u> 19657 6475 26132	FY 2001 19689 3891 23580				
B. Budget Acquisition History and Planning Information	History and	Planning Inf	<u>ormation</u>								
Organiza	ations Contract	·			E-						
Government M Performing or Activity V	Method/1 ype or Funding Vehicle	Award or Obligation Date	rerrorming Activity EAC	Project Office EAC	Prior to FY 1999	FY 1999	FY_2000	FY 2001	Budget to Complete	Total Program	
Developmen	Organization	18 0.407			1500	690	250	300	Cont	Cont	
Benning, GA	MIFK	76 130			2001	3		8		!	
WL, Quantico,	WR	Apr 98			200	650	235	208	Cont	Cont	
VA Lackland AFB, TX M	MIPR	Feb 00					365	340	Cont	Cont	
	MIPR	Oct 97			15607	14192	10199	9069	Cont	Cont	
Picatinny, NJ NSWC Various W	WR	Oct 97			4035	1376	1296	3474	Cont	Cont	
	MIPR	Oct 97			3605	6810	4325	4581	Cont	Cont	
	MIPR	Mar 98			300	250	35	20	Cont	Cont	
							3001	1001	7	Cont	
MCSC, Quantico, W	WK MIPR						1020	1021		Contract	
ous (M&S)	WR	Oct 97			1090	285	416	406	Cont	Cont	
	MIPR	Oct 97			650	2802	1510	1512	Cont	Cont	
Various (Service) M	MIPR							891	Cont	Cont	
Support and Management Organizations	nent Organiz	ations									
				R-1	R-1 Line Item 76	٠,		ā	Budget Item Justification	stification	
								<u>(E</u>	(Exhibit R-3, Page 5 of	je 5 of 6)	

UNCLASSIFIED

RDT	RDT&E PROGRAM ELEMEI	RAM EL	EMENT/PROJECT COST BREAKDOWN (R-3)	COST BR	EAKDO	WN (R-3		DATE Fe	February 2000	
BUDGET ACTIVITY 4 - Demonstration/Validation	ion/Validati	uo		PE NUMBER AND TITLE 0603851M Non-	ND TITLE A Non-L	PE NUMBER AND TITLE 0603851M Non-Lethal Warfare DEM/VAL	fare DEM	١.	PROJECT C2319	19 19
MCSC, Quantico,	WR	Oct 97		400	216	1095	2107	Cont	Cont	
NSWC, Dahlgren,	WR	Oct 97		756	293	405	425	Cont	Cont	
VA CTQMCSC,	RCP	Dec 97		602	3290	2669	603	Cont	Cont	
Quantico, VA Various MCLB, Albany,	RCP	Oct 97 Jan 00		450	2280	2056 250	456 300	Cont	Cont	
Test and Evaluation Organizations	Organizations	20								<u></u>
Government Furnished Property N/A Contract Method/Type A Item or Funding O Description Vehicle D Product Development Property	hed Property Contract Method/Type or Funding Vehicle nt Property	N/A Award or Obligation <u>Date</u>	Delivery <u>Date</u>	Total Prior to FY 1999	<u>FY 1999</u>	FY 2000	FY 2001	Budget to Complete	Total Program	-
Support and Management Property	gement Propert	£.								
Test and Evaluation Property	Property			Total						
Subtotal Product Development Subtotal Support and Management	relopment . Management			Prior to FY 1999 27287 2208	FY 1999 27055 6840	$\frac{\text{FY } 2000}{19657}$ 6475	FY 2001 19689 3891	Budget to Complete Cont	Total Program Cont Cont	
Subtotal Test and Evaluation Total Project	aluation			29495	33895	26132	23580	Cont	Cont	
			I	R-1 Line Item 76			B	Budget Item Justification	stification	
							Ú)	(Evhihit R-3 Page 6 of 6)	ne 6 of 6)	

(Exhibit R-3, Page 6 of 6)

DATE: February 2000

PROJECT NUMBER: X2691

4 BUDGET ACTIVITY:

PROLGRAM ELEMENT TITLE: JWE - BATTLE LAB 0603857N PROGRAM ELEMENT:

(U) COST (Dollars in thousands)

NUMBER & PROJECT

TITLE

PROGRAM TOTAL Y 1999 FY 2000 FY 2001 FY 2002 FY 2003 FY 2004 FY 2005 TO ACTUAL ESTIMATE ESTIMATE ESTIMATE COMPLETE FY 1999

X2691 All Service Combat Identification Evaluation Team (ASCIET)

CONT. CONT. 13,500 13,484 13,525 13,310 13,110 12,949

CONT. CONT. 13,484 13,500 13,525 13,310 13,110 12,949

RDI&E, Defense Wide (DW) budget submission. Funds for this program were transferred from the Joint Staff to the Department of Navy, which moves ASCIET from CJCS to CINCUSJFCOM beginning in FY00. Note: * Moved ASCIET from the Joint Staff to CINCUSACOM and ASCIET's RDT&E funding to the Department of Navy, Air Force as Executive Agent, effective FY 00. Prior year funds are reflected in the Joint Staff

through FY 1994. JADO/JEZ tested the ability of Service forces to execute an effective air defense (air-to-air and surface to air) network in a tactical environment. Because of the relatively high fratricides (ground-to-ground and air-to-ground) experienced in DESERT STORM and other conflicts, in December 1993, the Joint Requirements Oversight Council (JROC) directed that the JADO/JEZ Program convert to the ASCIET Program on 1 October 1994. ASCIET ran evaluations in 95, 96 and 97 in the Gulfport/Camp Shelby MS area. However because the Army was dissatisfied with the small maneuver area at Camp Shelby, ASCIET was directed by GOSC-Team (ASCIET) transferred from General Officer Steering Committee-Combat Identification (GOSC-CI) oversight to the Joint Staff during FY 1998. ASCIET was formed from the OSD-Sponsored Joint Air Defense Operations/Joint Engagement Zone (JADO/JEZ) Joint Test and Evaluation Program conducted during FY 1990 (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The All Service Combat Identification Evaluation selected Ft Stewart GA/East Coast as the ASCIET 99 evaluation venue and directed that ASCIET conduct a four Services' mission needs, and simultaneously support evaluation of all four combat ID mission areas. In addition the area of operations had to support cost effective, full instrumentation for collection of time, space, position information and shot pairing. Based on the Joint surveys, in March of 1998 the JROC provide recommendations that address organization, systems, technology, tactics, techniques and procedures (TTP) and doctrine. As part of JFCOM, ASCIET will become the primary demonstration/experimentation venue Computers and Intelligence (C4I) networks. Defense Reform Initiative Directive (DRID) #29 directed a study mission area evaluation in the Ft Stewart area. The ASCIET Mission is to investigate, evaluate and assess combat identification (CID) concepts and selected critical warfighting areas on the joint battlefield and CI to conduct Joint Service site surveys to find an operational area which would better support all four to determine which "joint agencies" should be transferred to a Unified Commander-in-Chief. The study determined that ASCIET should be transferred to the then United States STET Command (USACOM). As such, that utilizes and evaluates operational forces and robust tactical Command, Control, Communications,

R-1 Shopping List - Item No 77-1 of 77-9 UNCLASSIFIED

Exhibit R-2, RDT&E,N BUDGET ITEM JUSTIFICATION

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603857N

PROJECT NUMBER: X2691

DATE: February 2000

PROLGRAM ELEMENT TITLE: JWE - BATTLE LAB

continue its surface-to-surface, air-to-surface emphasis with a fix-test-fix approach to air defense in the Subsequently, CINC USJFCOM has directed ASCIET to Some future evaluations may take place at the National Training Center Assigned Air Force as Executive Agent for ASCIET. Ft Stewart area for FY2000.

includes efforts to evaluate integrated technologies in as realistic an operating environment as possible to (U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION AND VALIDATION because it assess the performance potential of current TTPs, weapons systems, and to help expedite technologies that meet the joint warfighters' needs. B. (U) PROGRAM CHANGE SUMMARY: Moved ASCIET from the Joint Staff to CINCUSACOM and ASCEIT'S RDT&E funding to the Department of Navy, Air force is Executive Agent for CINCUSACOM, effective FY 00. Prior year funds are reflected in the Joint Staff RDT&E, DW budget submission.

FY 2000: Congressional reduction (-\$78K).

FY 2001: Miscellaneous Departmental adjustments (-138K).

(U) Funding: RDT&E funds were budget base transferred from Joint Staff's RDT&E, DW budget to SPAWAR's RDT&E, N budget.

- (U) Schedule: No change.
- (U) Technical: No change.
- (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
- 1. (U) FY 1999 ACCOMPLISHMENTS:
- approved is CINCUSACOM's concept and plan for executing the Charter for ASCIET. It establishes the transfer time table and methodology. Describes how USJFCOM will task organize to accomplish the mission. ASCIET conducted the ASCIET 99 evaluation in the Ft Stewart/East Coast area in the February March 99 time frame. This evaluation was an increase in scope to the surface-to-surface (from company to battalion size elements) and also an expanded emphasis on air-to-surface. In order to meet these requirements, ASCIET changed its venue to a larger maneuver area (Ft Stewart, (U) USCINCACOM Implementation Plan (I-Plan) for the All Service Combat Identification Team (ASCIET) GA.) for ASCIET 99.

R-1 Shopping List - Item No 77-2 of 77-9 UNCLASSIFIED

Exhibit R-2, RDT&E,N BUDGET ITEM JUSTIFICATION

PROGRAM ELEMENT: 0603857N PROLGRAM ELEMENT TITLE: JWE - BATTLE LAB

PROJECT NUMBER: X2691

Hunter AAF, Wright AF, Savannah GA ANG Combat Readiness Training Center (CRTC), NAS Jacksonville, FL W-157/158 (over-water ranges), and the Quick Thrust/Gator/Moody/Live Oak Military Operating Areas (MOAs). The S-S evaluation utilized the Fort Stewart maneuver ranges. The A-S Quick Thrust MOAs R3005A/B/C/D/E,, and R3007A/B/C/D/E ranges. The AD evaluation was conducted over water in W157/158 ranges and over land in the Quick Thrust, Gator, Moody, and Live Oak MOAs. Blufor aircraft operated from Savannah CRTC, Hunter AAF, Moody AFB, and NAS Norfolk, OPFOR aircraft operated from NAS Jacksonville, NAS Cecil Field, NAS Oceana, and Robins AFB. The war was conducted (A-S), and Air Defense (AD) that includes surface-to-air and Air-to-Air (A-A). ASCIET 99, Held from 1 through 11 March, was fourth in a series of annual ASCIET combat ID evaluations. There were over 5,000 participants from the four services including reserve components and service-sponsored during a 5-hour vulnerability window each evaluation day. The vulnerability window on 1-5 March was 0900-1400 to support daylight operations. The vulnerability window on 7-11 March was 1700-2200 Every participant that moved during the vulnerability window was combat ID during the course of the evaluation. In addition to TTP excursions, ASCIET also measured instrumented for Time-Space-Position Information (TSPI) and weapon engagements. Real-Time Casualty were encouraged to develop innovations in Tactic, Techniques, and Procedures (TTP) to improve joint systems. This class of technology was considered on-line, and the influence of those technologies to support daylight operations transitioning to night operations. The evaluation environment was an air, land, and sea joint littoral battle space in a mild climate. The land range included moderately rolling terrain and vegetation that limited clear lines of sight and encouraged use of Assessments (RTCA) and kill removals were used when appropriate. Players compared their perceptions against what actually took place on the battlefield during truth-based postmission debriefs. These factual debrief provided an opportunity for discovery and learning. Participants (U) FY 1999 EVALUATION: The priorities for ASCIET 99 were Surface-to-Surface (S-S) Air-to-Surface and Altitude Reservation (ALTREVS) to create a seamless airspace allowing multi-axis overland and participate on a not-to-interfere basis in an off-line status. Offline-line technologies are not over-water attacks culminating at the ground battle. Some flight restrictions were necessary to terrain-masking techniques. The airspace was a compilation of MOAs, warning and restricted areas the influence of certain developmental technologies against the base line of currently fielded technologies from industry. ASCIET 99 was conducted in an area that encompassed Fort Stewart, on combat ID will be evaluated and reported. ASCIET also allowed certain technologies to operated from NAS Jacksonville, NAS Cecil Field, NAS Oceana, and Robins AFB. part of our analysis and will not be evaluated in the ASCIET final report. comply with airspace limitations.

BUDGET ACTIVITY:

PROLGRAM ELEMENT TITLE: JWE - BATTLE LAB 0603857N PROGRAM ELEMENT:

PROJECT NUMBER: X2691

DATE: February 2000

FY 2000 PLAN: Ð

- assets will be fully instrumented. Instrumentation provides time, space, position information and shot pairing for real time casualty assessment, and kill removal subsequent analysis. Results from the instrumentation will point to solutions to combat ID deficiencies. Contractor support will be required for instrumentation installation and checkout and to ensure instrumentation is reliable ASCIET's expanded surface-to-surface and air-to-surface operation force scenario in littoral area. ASCIET's expanded surface-to-surface and air-to-surface operati will continue to require full instrumentation of a battalion size task force, an opposing (OPROR) and accurate. OPFOR vehicles and air defense systems will be real Former Soviet Union equipment and will be leased and transported from their home base to the evaluation location. ASCIET will fund travel, billeting and per diem for over 6000 participants consisting of service warfighters Site visits and airborne platforms. Air defense platforms including aircraft, ships at sea and land based (U) (\$5,660) Evaluation Support. ASCIET 2000 will be a simulated combat, realistic, joint task and augmentees for security, weapons systems expertise and airspace support (FAA). required to prepare for the evaluation will be conducted as necessary.
- (U) (\$851) ASCIET Support. ASCIET will remain as a tenant at Eglin AFB requiring base support including utilities, waste disposal and cleaning contracts. These are new costs for ASCIET brought about due to the transfer to USACOM. In prior years, ASCIET as Detachment 1 of the 53rd Fighter Wing, was not required to pay such bills as they were covered by the 53rd Fighter Wing. ASCIET will maintain and upgrade its analysis capabilities with needed software and hardware improvements. The following major documents will be published for ASCIET 2000: Evaluation Spin-up Plan, Evaluation Plan 45-day Quick Look Report and Final Report. Quick Look and Final results briefings will be prepared and presented to the Joint Staff, the services and the Commanders-in-Chief The ASCIET staff will provide technical and operational support to forums dealing with combat ID issues e.g., the Joint Integrated Air Defense Interoperability Working Group and the World Wide Combat ID conference.
- real world joint combat operations. Participant command and control systems data tactical displays, voice and data link communications, identification systems data engagement decisions will be thoroughly analyzed to determine cause of fratricide and assist in developing solutions. targets will also be evaluated and analyzed. ASCIET's focus will be on tactics, techniques and procedures (TTP), interoperability and combat systems. A white force (evaluation control) network will be designed and constructed to meet ASCIET 2001 scenario requirements. A classified debriefing network will also be designed and constructed to allow participants at up to eight The ASCIET 2000 evaluation scenario will be developed to mirror different geographical locations, including ships at sea, to debrief the mission of the day. Overall mission effectiveness to include exchange ratios, lost shot opportunities and missed (\$6,133) Annual Contracts.

R-1 Shopping List - Item No 77-4 of 77-9 UNCLASSIFIED

Exhibit R-2, RDT&E,N BUDGET ITEM JUSTIFICATION

DATE: February 2000

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603857N PROLGRAM ELEMENT TITLE: JWE - BATTLE LAB

PROJECT NUMBER: X2691

debriefing process will allow the participants the opportunity to discover and learn and to adjust TTP and systems performance for the following day.

- (U) (\$305) Conferences. ASCIET will host five planning conferences: Air Space, OPFOR, Initial Planning, Mid-Term planning and Final Planning. Through these planning conferences, warfighter participants will be an integral part of the planning process including scenario development and preparation for interoperability between the services.
- (U) Venue for FY00 is currently planned for the Ft Stewart, GA area. Fiscal considerations dictate that the FY00 evaluation again be conducted at Ft Stewart and the surrounding area; however, this is an ongoing staff effort and will require service component coordination.

3. (U) FY 2001 PLAN:

- force scenario in littoral area. ASCIET's expanded surface-to-surface and air-to-surface operation will continue to require full instrumentation of a battalion size task force, an opposing (OPROR) and airborne platforms. Air defense platforms including aircraft, ships at sea and land based assets will be fully instrumented. Instrumentation provides time, space, position information and shot pairing for real time casualty assessment, and kill removal subsequent analysis. Results from the instrumentation will point to solutions to combat ID deficiencies. Contractor support will be required for instrumentation installation and checkout and to ensure instrumentation is reliable and accurate. OPFOR vehicles and air defense systems will be real Former Soviet Union equipment and will be leased and transported from their home base to the evaluation location. ASCIET will fund travel, billeting and per diem for over 6000 participants consisting of service warfighters ASCIET 2001 will be a simulated combat, realistic, joint task and augmentees for security, weapons systems expertise and airspace support (FAA). required to prepare for the evaluation will be conducted as necessary. (U) (\$5,732) Evaluation Support.
- including utilities, waste disposal and cleaning contracts. These are new costs for ASCIET brought about due to the transfer to USACOM. In prior years, ASCIET as Detachment 1 of the 53rd Fighter Wing was not required to pay such bills as the 53rd Fighter Wing covered them. ASCIET will maintain and upgrade its analysis capabilities with needed software and hardware improvements. The following major documents will be published for ASCIET 2001: Evaluation Spin-up Plan, Evaluation prepared and presented to the Joint Staff, the services and the Commanders-in-Chief (CINCs). The ASCIET staff will provide technical and operational support to forums dealing with combat ID issues Plan 45-day Quick Look Report and Final Report. Quick Look and Final results briefings will be ASCIET will remain as a tenant at Eglin AFB requiring base support (\$932) ASCIET Support.

EXHIBIT R-2, FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603857N PROLGRAM ELEMENT TITLE: JWE - BATTLE LAB

PROJECT NUMBER: X2691

February 2000

DATE:

e.g., the Joint Integrated Air Defense Interoperability Working Group and the World Wide Combat ID conference.

- network will also be designed and constructed to allow participants at up to eight different geographical locations, including ships at sea, to debrief the mission of the day. This debriefing (\$6,125) Annual Contracts. The ASCIET 2001 evaluation scenario will be developed to mirror real mission effectiveness to include exchange ratios, lost shot opportunities and missed targets will also be evaluated and analyzed. ASCIET's focus will be on tactics, techniques and procedures Overall process will allow the participants the opportunity to discover and learn and to adjust TTP and Participant command and control systems data tactical displays, (TTP), interoperability and combat systems. A white force (evaluation control) network will be voice and data link communications, identification systems data engagement decisions will be designed and constructed to meet ASCIET 2001 scenario requirements. A classified debriefing thoroughly analyzed to determine cause of fratricide and assist in developing solutions. systems performance for the following day. world joint combat operations. •
- Planning, Mid-Term planning and Final Planning. Through these planning conferences, warfighter participants will be an integral part of the planning process including scenario development and (U) (\$321) Conferences. ASCIET will host five planning conferences: Air Space, OPFOR, Initial preparation for interoperability between the services.
- C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

PROGRAM ACTUAL ESTIMATE ESTIMATE ESTIMATE ESTIMATE ESTIMATE ESTIMATE FY 2003 FY 2004 FY 2005 FY 2002 FY 2001 FY 2000 FY 1999

- (U) Procurement
- М О С (П)

Note: *O&M and procurement funds remain funded in XXXX and did not shift to Navy for executive agency.

(U) RELATED RDT&E: Not applicable

EXHIBIT R-2, FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603857N

PROJECT NUMBER: X2691

DATE: February 2000

PROLGRAM ELEMENT TITLE: JWE - BATTLE LAB

D. (U) ACQUISITION STRATEGY

• FY 1999-01.

Competitive contract was awarded to SAIC in Sept 98 on a GSA schedule for ASCIET advisory and technical support, also contract awarded to Mevatec on 1 Feb 95 (2 year + 3 option years). Several Sole source contracts for short periods to conduct the annual evaluation that include Video Conferencing ability to software applications and instrumentation packages for vehicles for data collection.

EXHIBIT R-3, FY 2001 RDT&E,N PROJECT COST ANALYSIS

BUDGET ACTIVITY:

PROJECT NUMBER: X2691

DATE: February 2000

PROGRAM ELEMENT: 0603857N PROGRAM ELEMENT TITLE: JWE - BATTLE LAB

Exhibit R-3 Cost Analysis (nade 1	Analvais (nac	1)						Date: F	FEB 2000			
APPROPRIATION/BUDGET ACTIVITY	GET ACTIVITY	1319/BA 4	PROGRAM	ELEMENT:	0603857N	5		PROJECT	NAME AN	PROJECT NAME AND NUMBER:	ASCIET/X2691	X2691
	Contract	Performing	Total		FY99		FYOO		FY01			Target
	Method &	Activity &	PYs	FY99	Award	FYOO	Award	FY01	Award	Cost To	Total	Value of
Cost Categories	Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	Contract
Operational Test	C/FP PO	SAIC				4,214		4,214		Cont	Cont	Cont
& Evaluation		EGLIN AFB					15 Oct					
Operational Test	SS/CPFF	Stanford				148		148		Cont	Cont	Cont
& Evaluation	MIPR	Research										
		Inst, Menlo Park										
		CA	•									
Operational Test	SS/FP PO	MEVATEC				1,914		1,914		Cont	Cont	Cont
& Evaluation		EGLIN AFB					31 Jan			ì		
Evaluation other	Niper/PO	Savannah GA				5,780	Var	5,758		Cont	Cont	Cont
Costs												
Travel and		ASCIET/	•			402		773		Cont	Cont	Cont
Conferences		Various										•
Operation		ASCIET/	•			184		303		Cont	Cont	Cont
Costs/Research		Various										
Subtotal T&E						12,949		13,110				
Remarks:												
Subtotal Support												

R-1 Shopping List - Item No 77-8 of 77-9 UNCLASSIFIED

Exhibit R-3, RDT&E,N PROJECT COST ANALYSIS

EXHIBIT R-3, FY 2001 RDT&E, N PROJECT COST ANALYSIS

BUDGET ACTIVITY:

PROJECT NUMBER: X2691

DATE: February 2000

PROGRAM ELEMENT: 0603857N PROGRAM ELEMENT TITLE: JWE - BATTLE LAB

Exhibit R-3 Cost Analysis (page 2)	vsis (page	2)						Date:	FEB 2000	00		
APPROPRIATION/BUDGET ACTIVITY: 1319/BA 4	IVITY: 1319/	BA 4	PROGRAM ELEMENT:	1	0603857N			PROJECT	T NAME AN	PROJECT NAME AND NUMBER: ASCIET/x2691	CIET/x26	11
	Contract	Performing	Total	Н	FY99		FY00		FYO1			Target
	껗	Activity &	PYS		Award	FYOO	Award	FY01	Award	Cost To	Total	Value of
Cost Categories	Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	Contract
										į		
Subtotal T&E												
Remarks												
Subtotal Management												
Remarks												
Total Cost					:	12,949		13,110				

APPROPRIATION/BUDGET ACTIVITY RDT&E,N - BA4	Exhibit R-2, RDT&B Budget Item Justification	OTER BA	udget Ite	m Justifice	ation		Pr<	Date: ogram Eleme	Date: Jan 2000 Program Element Name & No. PR 0604327N Hardened Target Munitions	ons

C sot (\$ 1n Millions)	FY 1999		FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	2005	Cost to Complete	Total
Total PE Cost	2	2.9	4.9	0	0	0	0	0	CONT.	CONT.
J2331 Hard Target Munitions		0	6.4	0	0	0	0	o		
J2629 Hard Target Munitions	2	2.9	0	0	0	0	0	0	CONT	CONT
		+							CONT	CONT
RDT&E Articles Otv		<u> </u>								
An Advanced Penetrator Definition Program will develop an advanced conventional earth penetrating warhead for use on conventional ballistic missiles. (U) JUSTIFICATION FOR BUDGET ACTIVITY: The Advanced Penetrator Definition Program is appropriately justified in BA-4, Demonstration and Validation, as this effort evaluates advanced conventional earth penetrating warhead materials in as realistic an operating environment as possible to assess the performance of advanced technology.	cator per intercertal for use of for use of for use of from subder fried in Baral barable to assible itio n n titio n ACT ACT ACT ACT Sess	Aged in Broot in Broot in Broot in IVITY: Demons rating the P	ream will onal ba The A tration warhea erforma	1. devel 1. listic dvanced 1. and va nce of nce of	op an institution of an institution of advance advance	advance les. rator De na as to ed techi	d conversion this efficient of the first of	ntional ear on Program fort evalua an operatii	th ng	
B. (U) Program Change Summary:	nge Summary	÷.					FV1 999	FY 2000	ç	
FY 2000 President's Budget: Appropriated Value:	t's Budget: ue:					••	3.0	4.4	فإم م	

R-1 Item No 79 - 1 of 79 - 10

Exhibit R-2 RDT&E Budget Item (Exhibit R-2, Page 1 of 10)

	Exhibit R-2, RDT&E Budget Item Justification		Date: Jan 2000
APPROPRIATION/BUDGET ACTIVITY RDTEE,N - BA4	VITY	Program PE 0604327N	Program Element Name & No. PE 0604327N Hardened Target Munitions
Adjustments to -0.1 FY 2001 Pr	Adjustments to FY 1999/2000 Appropriated Value/ FY 2000 President's Budget: -0.1 FY 2001 President's Budget Submit: 2.9	/ FY 2000 President's	Budget:
xplanation: Th .(U) Other Pro data.	Explanation: The FY 1999 reduction (1) was attributable to SBIR. C. (U) Other Program Funding Summary: See enclosed R-2a for each individual project data.	ributable to SBIR. sed R-2a for each ind	lividual project
D. (U) Acquisition Strategy:	on Strategy: See enclosed R-2a f	See enclosed R-2a for each individual project data.	roject data.
. (U) Schedule	E. (U) Schedule Profile: Not Applicable.		

R-1 Item No 79 - 2 of 79 - 10 Exhibit R-2 RDT&E Budget Item (Exhibit R-2, Page 2 of 10)

ın 2000		Cost to Total	CONT. CONT.		onal earth			1	EXNIBIC K-Za KDIŒE FIOJECC OBSLILICACION (Exhibit R-2a, Page 3 of 10)
Date: Jan 2000	_	FY (convent				bit R-2a
	per. 3 J2331	FY 2004	0		dvanced es.			29	Exhi
	Project Name and Number. Hard Target Munitions J2331	FY 2003	0		tion: op an a missil			FY 1999 PLAN: Funding is provided in Project J2629 R-1 Item No 79 - 3 of 79 - 10 of 19 - 10 of 1	-א שנסננ
ion	Project Na Hard Targe	FY 2002	0		stifica 11 devel allistic			in Proj - 3 of	EXI
Justificat	& No. Target	FY 2001	0		item Ju jram wil onal ba			ovided No 79	rgruxa
&E Project	Program Element Name & No. PE 0604327N, Hardened Target Munitions	FY 2000	4.9		Budget on Prog		PLANS:	ng is provided R-1 Item No 79	
Exhibit R-2a, RDT&E Project Justification	Program El PE 0604327N	FY 1999	0		on and Definiti use on c		rs and e	Fundin	
Exhibit					scripti trator I id for u		LISHMENT	9 PLAN:	
	APPROPRIATION/BUDGET ACTIVITY RDT&E, N - BA4	Cost (\$ in	Project Cost J2331 Hard Target Munitions	RDT&E Articles Otv	A. (U) Mission Description and Budget Item Justification: The Advanced Penetrator Definition Program will develop an advanced conventional earth penetrating warhead for use on conventional ballistic missiles.		(U) PROGRAM ACCOMPLISHMENTS AND PLANS:	1. (U) FY 199	

Exhibit R-2a, RDTwE Project Justification Date: Jan 2000
APPROPRINTION/BUDGET ACTIVITY Program Element Name & No. Project Name and Number. RDKE,N - BA4 Munitions J2331 Munitions J2331
2. (U) FY 2000 PLAN:
(<u>D</u>)
by the 4 quartet of the first year. Fi zoov efforts include: (1) Define penetrator fuze requirements.
(U) intrace resting to obtain environment data on penetiators which impact concrete at velocities up to 4000 feet per second. (U) Initiate preliminary design of the missile/reentry body
separation system. (U) Initiate trade studies focusing on internal packaging and
system guidance architectures.
מ
degradation due to jamming. (U) Provide funds to the Air Force for completion of Analysis
of Alternatives (AOA) activities.
3. (U) FY 2001 PLAN: N/A
B. (U) Other Program Funding Summary: (Dollars in Thousands)
te
R-1 Item No 79 - 4 0
Exhibit R-2a RDIWE Project Justification (Exhibit R-2a, Page 4 of 10)
CHIPTORGION

Date: Jan 2000	
Exhibit R-2a, RDT&E Project Justification	Program Element Name & No. Project Name and Number. PP 0604327N, Hardened Target Hard Target Munitions J2331 Munitions
	APPROPRIATION/BUDGET ACTIVITY RDT&E,N - BA4

N/A		Of Of O(1)
N/A		n the TR nnd/or ne basis C. 2304
N/A		engaged i duction a ems on th
N/A		who were on the proposed Syst.
N/A		sources v ngaged ir egic Weag o the aut
N/A	¥ 1999	o those rently e C4 Strat rsuant t
N/A N/A N/A N/A N/A N/A N/A N/A	2629 in F	awarded t d are cur lloyed DS/ tition pu
N/A	Project J	tegy: nue to be rogram an f the dep pen Compe
N/A	(U) Related RDT&E: Project J2629 in FY 1999	C. (U) Acquisition Strategy: Contracts will continue to be awarded to those sources who were engaged in the TRIDENT II (D5) development program and are currently engaged in the production and/or operational support of the deployed D5/C4 Strategic Weapons Systems on the basis of other Than Full and Open Competition pursuant to the authority of 10 U.S.C. 2304 ©(1) and (3) implemented by FAR 6.3021, 3 4.
	<u>(a</u>	(U) Contr II (D Opera Other
		ΰ

D. (U) Schedule Profile: Not Applicable.

R-1 Item No 79 - 5 of 79 - 10 Exhibit R-2a RDT&E Project Justification (Exhibit R-2a, Page 5 of 10)

Exhibit R-3, Cost Analysis			Date: Jan 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E,N - BA4	Program Element Name & No. PE 0604327N, Hardened Target Munitions	Project Name and Number. Hard Target Munitions J2331	

Cost Categories	Contrac	Performing Activity &	Total		FY99 Award	FYOO	FYOO	FY01	FY01 Award	Cost To		Target Value of
Product Development	Method & Type		Cost	Cost	Date	Cost	Date	Cost	Date	Complete		Contract
Ancillary Hardware	SS/CPFF	LMDS/CAL.	1.2	0.0	N/A	1.0	66/01		A/N	Cont.	Cont.	Cont.
Ancillary Hardware Development	SS/CPFF	SPA/MD	0.2	0.0	N/A	7.	66/01		N/A	Cont.	_	Cont.
Ancillary Hardware Development	WR	AIR FORCE	0.0	0.0	N/A	.1	66/01		N/A	Cont.		Cont.
Ancillary Hardware Development	MIPR	DOE/NM	1.5	0.0	N/A	1.7	66/01		N/A	Cont.	Cont.	Cont.
Ancillary Hardware Development	WR	ARMY/ALA	1.1	0.0	N/A	1.4	66/01		N/A	Cont.		Cont.
Ancillary Hardware Development	SS/CPFF	CSDL/MA	0.0	0.0	N/A	9.	66/01		W/A	Cont.	Cont.	Cont.
Subtotal Product Development			4.6	0.0		4.9						
Remarks:										i.	-	Ċ
Total Cost			4.6	0.0		4.9				Cont.	Cont.	cont.
Remarks:												

R-1 Item No 79 - 6 of 79 - 10 Exhibit R-3 RDT&E Project Justification (Exhibit R-3, Page 6 of 10)

Date: Jan 2000	
fication	Project Name and Number.
Exhibit R-2a, RDT&E Project Justif	Program Element Name & No. PE 0604327N Hardened Target Munitions
Bxb	APPROPRIATION/BUDGET ACTIVITY RDT&E, N - BA4

Cost (\$ in	FY	FY	FY	FY	FΥ	FΥ	FΥ	ΨY	Cost to	Total
Millions)	1998	1999	1999 2000	2001	2002	2003	2004	2002	2005 Complete	Cost
Project J2629	*0	2.9	*0	0	0	0	0	0	CONT.	CONT.
Hard Target										
Munitions										
RDT&E Articles										
Qty										
		1								

A. (U) Mission Description and Budget Item Justification: The Advanced Penetrator Definition Program will develop an advanced conventional earth penetrating warhead for use on conventional ballistic missiles.

* Funded in Project J2331

PROGRAM ACCOMPLISHMENTS AND PLANS:

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R-1 Item No 79 - 7 of 79 - 10 Exhibit R-2a RDT&E Project Justification (Exhibit R-2a, Page 7 of 10)

Extraction Functor Name			Exhibit R-2a, RDY&E Project Justification Date: Jan 2000
1. (U) FY 1999 Plan (2.9) This supports a Milestone I acquisition decision. Conducted a joint Navy/Air Force Analysis of	1. (U) FY 1999 Plan (2.9) This supports a Milestone I acquisition decision. Conducted a joint Navy/Air Force Analysis of Alternatives (AoA) buried a joint Navy/Air Force Analysis of Alternatives (AoA) buried a joint Navy/Air Force Analysis of Eagle Cast is fully hard and deeply obligated. FY 1999 efforts included. (U) Program Office AOA Studies/Analysis. (U) Produced documentation for Defense Acquisition Board (DAB), supported AOA efforts and DAB activities. (U) Supported AOA Alternative Defense Analysis. (U) FY 2000 Plan: Funded in Project J2331 3. (U) FY 2001 Plan: N/A FY 1999 FY 2000 F FY 2001 FY 2003 FY 2004 FY 2005 FY	APPROPRIATI RDT&E,N - B	Program Element Name & No. PE 0604327N Hardened Target Munitions
Duried (U) Program Office AoA support for the Generic Super Sonic Cruise Missile (U) Completed AoA support for the Generic Super Sonic Cruise Missile (U) Produced documentation for Defense Acquisition Board (DAB), supported AOA efforts and DAB activities. (U) FY 2000 Plan: Punded in Project J2331 3. (U) FY 2001 Plan: N/A B. (U) Other Program Funding Summary: (Dollars in Thousands) FY 1999 FY 2000 FY 2001 FY 2002 FY 2003 FY 2004 FY 2005TO R-1 Item No 79 - 8 Of 79 - 10 Exhibit R-22 Fribit eligated. FY 1999 efforts included: (U) Excoran Office AoA Studies/Analysis. (U) Produced documentation for Defense Acquisition Board (DAB), supported (U) Produced documentation for Defense Acquisition Board (DAB), supported (U) Produced documentation for Defense Acquisition Board (DAB), supported (U) Supported AoA Alternative Defeat Analysis. 2. (U) FY 2000 Plan: Funded in Project J2331 3. (U) FY 2001 Plan: N/A B. (U) Other Program Funding Summary: (Dollars in Thousands) FY 1999 FY 2000 FY 2001 FY 2002 FY 2003 FY 2004 FY 2005TO TOTAL R-1 Item No 79 - 8 of 79 - 10 Exhibit R-2a RDTEE Project Justification (Exhibit R-2a RDTEE Project Justification Exhibit R-2a, Page 8 of 10)	1. Conductass well	(U) FY 1999 Plan (2.9) This supports a Milestone I acquisition decision. d a joint Navy/Air Force Analysis of Alternatives (AOA) as initial planning efforts associated with establishing a joint hard and deeply	
(U) FY 2000 Plan: Funded in Project J (U) FY 2001 Plan: N/A (U) Other Program Funding Summary: (Dollars i FY 1999 FY 2000 FY 2001 FY 2003 R-1 Item No 79 - 8 ((U) FY 2000 Plan: Funded in Project J (U) FY 2001 Plan: N/A (U) Other Program Funding Summary: (Dollars i FY 1999 FY 2000 FY 2001 FY 2003 R-1 Item No 79 - 8 (buried obligat AOA eff	d. FY 1999 efforts included: (U) Program Office AOA support for the Generic Super Sonic Cruise Missile (U) Completed AOA Studies/Analysis. (U) Produced documentation for Defense Acquisition Board (DAB), supported rts and DAB activities. (U) Supported AOA Alternative Defeat Analysis.
(U) Other Program Funding Summary: (Dollars i	(U) Other Program Funding Summary: (Dollars i	7.	(U) FY 2000 Plan: Funded in Project J2331
(U) Other Program Funding Summary: (Dollars i FY 1999 FY 2000 FY 2001 FY 2002 FY 2003	(U) Other Program Funding Summary: (Dollars i FY 1999 FY 2000 FY 2001 FY 2002 FY 2003	æ.	(U) FY 2001 Plan: N/A
(U) Other Program Funding Summary: (Dollars i FY 1999 FY 2000 FY 2001 FY 2002 FY 2003	(U) Other Program Funding Summary: (Dollars i FY 1999 FY 2000 FY 2001 FY 2002 FY 2003 R-1 Item No 79 - 8		
FY 2000 FY 2001 FY 2002 FY 2003 R-1 Item No 79 - 8	FY 2000 FY 2001 FY 2002 FY 2003 R-1 Item No 79 - 8		
R-1 Item No 79 - 8 0	R-1 Item No 79 - 8		FY 2000 FY 2001 FY 2002 FY 2003 FY 2004 FY 2005TO
	(EXIIDIC K-Za, Fage 8 OI IU)		R-1 Item No 79 - 8 0

Date: Jan 2000	
lon	Project Name and Number. Hard Target Munitions - J2629
Exhibit R-2a, RDT&E Project Justification	Program Element Name & No. PE 0604327N Hardened Target Munitions
Exhi	APPROPRIATION/BUDGET ACTIVITY RDTGE,N - BA4

COMPLETE N/A

ESTIMATE N/A

ESTIMATE N/A

ESTIMATE N/A

(U) Related RDT&E: Project J2331 in FY 1998 and FY 2000

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(U) Acquisition Strategy:
Contracts will continue to be awarded to those sources who were engaged in the TRIDENT
II (D5) development program and are currently engaged in the production and/or
operational support of the deployed D5/C4 Strategic Weapons Systems on the basis of
Other Than Full and Open Competition pursuant to the authority of 10 U.S.C. 2304 (c)
(1) and (3) implemented by FAR 6.302.-1, 3 4.

Schedule Profile: Not Applicable

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R-1 Item No 79 - 9 of 79 - 10 Exhibit R-2a RDT&E Project Justification (Exhibit R-2a, Page 9 of 10)

Date: Jan 2000	
tion	Project Name and Number. Hard Target Munitions - J2629
Exhibit R-2a, RDT&B Project Justifica	Program Element Name & No. PE 0604327N Hardened Target Munitions
Bxh	APPROPRIATION/BUDGET ACTIVITY RDT&E,N - BA4

Cost Categories	Contrac	Performing Activity &	Total PYs	FY99	FY99 Award	FYOO	FY00	FY01	FY01 Award	Cost To	Total	Target Value of
Product Development	method & Type	rocacion	Cost	COBIL	nace	COST	Date	COST	Date	comprere		CONCLACE
Ancillary Hardware Development	SS/CPFF	SPA/MD	.00	.2	12/98	0.0	N/A		N/A	Cont.	Cont.	Cont.
Ancillary Hardware Development	WR	NAWC/NJ	.00	E.	12/98	0.0	N/A		N/A	Cont.	Cont.	Cont.
Ancillary Hardware Development	MIPR	DOE/NM	.00	4.	12/98	0.0.	N/A		N/A	Cont.	Cont.	Cont.
Ancillary Hardware Development	WR	ARMY/ALA	.00	4.	12/98	.0.0	N/A		N/A	Cont.	Cont.	Cont.
Ancillary Hardware Development	ω	Air Force	.00	1.5	12/98	0.0	N/A		N/A			
Ancillary Hardware Development	SS/CPFF	CSDL/MA	0.0	1.	.1 12/98	0.0	N/A		N/A			
Subtotal Product Development			0.0	2.9		0.0						
Remarks:											ļ.	
Total Cost			9:	2.9		0.0				Cont.	Cont.	Cont.
Remarks:												

R-1 Item No 79 - 10 of 79 - 10 Exhibit R-2a RDT&E Project Justification (Exhibit R-2a, Page 10 of 10)

FY 2001 RDT&E,N Budget Item Justification Sheet

FEBRUARY 2000

DATE:

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N

PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support

(U) COST: (Dollars in Thousands)

PROJECT

NUMBER TITLE	FY 1999 ACTUAL		FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2000 FY 2001 FY 2002 FY 2003 FY 2004 FY 2005 TO TOTAL ESTIMATE ESTIMATE COMPLETE PROGRAM	TO COMPLETE	TOTAL PROGRAM
X0798 OTH Targeting	1,527	1,591	2,109		2,191	2,569	2,653	Cont.	Cont.
X2144 SEW Engineering	7,973	8,545	8,154		7,200	890'6	9,345	Cont.	Cont.
R2357 Maritime Battle Center		23,784	23,837		23,906	23,855	23,819	Cont.	Cont.
R2630 Adv Comm Info Tech		1,936 2,984	0	0	0	0	0	0	4,920
TOTAL	22,576	36,904	34,100		33,297	35,492	35,817	Cont.	Cont.

The MBC will also act as the Navy representative to the Joint Battle Center Center, and Advanced Communications Information Technology (ACI). The projects are systems engineering nonexperimentation and analysis coordinated by the Naval War College, and the Navy Warfare Development Command, technologies primarily through integration of government and commercial off-the-shelf (GOTS/COTS) products to enhance the Navy's operational capability, interoperability, flexible reconfiguration, as well as reduce multiple tasks that are used to ensure Naval C4ISR Command and Control Warfare (C2W) components of SEW are "Forward...From the Sea," C4I For the Warrior, and the Defense Science Board Summer Study Task Force on Information Architecture for the Battlefield and are guided by CINC requirements; and (2) that SEW systems Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) architectures to support and C4ISR technical and acquisition support coordinated by the Space and Naval Warfare Systems Command in For MBC, there will be a claimant change from Space and Naval Warfare Systems Command to Office of acquisition programs with the objectives of developing, testing, and validating Naval Command, Control, effectively integrated into the C4ISR architectures. The Program additionally ensures that (1) the composite operational capabilities of SEW systems (not the individual component systems) conform to the Over-the-Horizon Targeting, Space and Electronic Warfare (SEW) Engineering, Maritime Battle visions and direction, such as Joint Vision 2010 (JV 2010), "Copernicus...C4ISR for the 21st Century," Naval C4ISR architecture as related to the objectives of National Defense Strategy and evolving joint naval missions in Joint and Coalition Theater. The mission of this program element is carried out by This Program Element (PE) contains four costs. The Maritime Battle Center is a distributed organization consisting of concept development, and systems integration effort involves leading-edge technology transfer of information processing MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: and the Battle Labs of other services. Naval Research, effective FY00.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 1 of 28)

FY 2001 RDT&E, N Budget Item Justification

DATE: FEBRUARY 2000

4 BUDGET ACTIVITY:

PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng

develops and integrates hardware for experimental tests related to specific ship or aircraft applications. It also develops a virtual demonstration and validation environment across Navy for C4ISR. JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it

B. (U) PROGRAM CHANGE FOR TOTAL P.E.:

FY 2001	35,912			- 1,437	- 337		- 38	
FY 1999 FY 2000	19,804 35,170 38,170		- 204	3,000		*		-1,062
FY 1999	19,804	3,283			- 90	- 421		
	<pre>(U) FY 2000 President's Budget:</pre>	- Execution Adjustments	 Congressional Recission 	- Minor Program Adjustments	 Various Rate Adjustments 	- SBIR/STTR Transfer	 Strategic Sourcing Adjustment 	- Program Adjustment

*\$112K is portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

34,100

36,904

22,576

FY 2001 President's Budget Submission:

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 2 of 28)

FY 2001 RDT&E,N Budget Item Justification

FEBRUARY 2000

DATE:

PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng

) COST: (Dollars in Thousands)

BUDGET ACTIVITY:

ESTIMATE ESTIMATE ESTIMATE ESTIMATE ESTIMATE COMPLETE PROGRAM FY 2005 FY 2004 FY 2003 FY 2002 FY 2001 FY 2000 FY 1999 ACTUAL NUMBER TITLE

Cont. 2,653 2,569 2,191 2,166 2,109 1,591 1,527 X0798 OTH Targeting

Cont.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Over-the-Horizon Targeting (OTH-T) program provides a virtual, global systems integration and test facility for Information Technology for the 21st Century (IT-21) C4ISR technology that supports the collection, transmission, correlation, and display of track data into a Common JV 2010 implementing IT-21 technology. The second goal of the OTH-T program will be to support the integration of all C4I systems into warfighting capabilities which includes Year 2000 (Y2K) integration and testing. This for merging improved TCP/IP capability with ADNS and existing international standards (e.g.: STANAG 5066). Funding will also allow for development of subnet relay protocols which will provide for a significant improvement Allied interoperability requirements. Data throughput will need to be increased for the exchange of larger sized files within the limitations of the HF medium. Funding will allow for further development of potential solutions Operational Picture (COP) in support of warfighting requirements. This effort was originally undertaken to support targeting of over the horizon weapons such as the TOMAHAWK cruise missile. The common view of the battle integration and testing in support of the warfighting capabilities will also include Y2K interoperability testing interoperability is an important issue for future naval operations, especially with the Navy initiative to expand The result is exist to solve the IP connectivity issue with Allies. Funding will allow development of solutions for emerging that the first goal of the OTH-T program is to transition the OTH architectures and systems from older MIL STD demonstrations which are used to validate and evaluate developed portions of configuration. The OTH-T program Internet Protocol (IP) networking throughout the Fleet (IT-21 and Naval Intranet). Specific solutions do not Engineers who ensure smooth integration of new capabilities to enhance OTH-T during major Fleet exercises and technologies to COTS based technologies that support the network centric model of the Navy's plan to support support includes providing technical expertise afloat and ashore via a cadre of highly-trained Fleet Systems space that was provided to the warfighter by OTH-T has been applied across the spectrum of warfare missions; Allied however, the technology and doctrine on which it was based has changed radically in recent years. for both MIL-STD and IT-21 COTS equipment for submarines, surface, and land based components. within battlegroups.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 3 of 28)

FY 2001 RDT&E, N Budget Item Justification

DATE: FEBRUARY 2000

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng

PROJECT NUMBER: X0798
PROJECT TITLE: OTH TARGETING

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1999 ACCOMPLISHMENTS:

- documents which were used by the programs of record to define system functional requirements that support these capabilities. Developed system interface standards where required. Provided a valid master (\$147) Based on results of integration testing, developed capability functional description configuration database in support of the new IT-21 Battle Group configurations.
- (U) (\$302) Conducted systems integration, interoperability, and Y2K testing using the facilities of Land Based Test Network (LBTN) and Systems Integration and Test (expanded RLBTS to validate IT-21 technologies prior to shipboard installation).
- policy and doctrine for operations of Naval Intranet (NI) in support of Network Centric Warfare ideology. Served as technical expert in researching the fleet's technical questions and providing information. supporting systems to the fleet. Worked with the fleet staffs and Naval Doctrine Command to develop (\$474) Validated and verified the interoperability of architectures for new capabilities and
- engineers made input into the SPAWAR advanced technology division to insure critical deficiencies are high priority during investigation of IT-21. Provided connectivity and conduct integration and interoperability testing to verify Y2K compliance and provided systems engineering expertise for both IT-(U) (\$399) Ensured joint interoperability of all systems on the NI by enforcing compliance with the Joint Technical Architecture and Y2K. Verified relevance, recommended modifications to, and maintained OTH-T specifications for support of distribution of the COP to maritime forces. The program's systems 21 and MIL-STD technologies.
- (\$205) Provided software enhancements to the REPEAT software including adapting the software operationally to transfer Mission Data Updates through available data links.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 4 of 28)

FY 2001 RDT&E,N Budget Item Justification

DATE: FEBRUARY 2000

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng

PROJECT NUMBER: X0798
PROJECT TITLE: OTH TARGETING

2. (U) FY 2000 PLAN

- (\$154) Based on results of integration testing, develop capability functional description documents which will be used by the programs of record to define system functional requirements that support these capabilities. Develop system interface standards where required. Provided a valid master configuration database in support of the new IT-21 Battle Group configurations.
- Conduct systems integration, interoperability, and Y2K testing using the facilities of the est Network (LBTN) and Systems Integration Environment. (RLBTS has been expanded to validate Land Based Test Network (LBTN) and Systems Integration Environment. IT-21 technologies prior to shipboard installation.) (\$314)
- (U) (\$492) Validate and verify the interoperability of architectures for new capabilities and supporting systems to the fleet. Work with the fleet staffs and Naval Doctrine Command to develop policy and doctrine for operations of NI in support of Network Centric Warfare ideology. Serve as technical expert doctrine for operations of NI in support of Network Centric Warfare ideology. in researching the fleet's technical questions and providing information.
- Technical Architecture and Y2K. Verify relevance, recommend modifications to, and maintain OTH-T specifications for support of distribution of the COP to maritime forces. The program's systems engineers will make input into the SPAWAR advanced technology division to insure critical deficiencies are high priority during investigation of IT-21. Provide connectivity and conduct integration and interoperability (\$417) Ensure joint interoperability of all systems on the NI by enforcing compliance with the Joint testing to verify Y2K compliance and provide systems engineering expertise for both IT-21 and MIL-STD technologies.
- (\$214) Conduct integration testing of OTH-T and combat systems. Ð
- 3. (U) FY 2001 PLAN
- (U) (\$246) Integrate code combination techniques developed during FY00 into internationally agreed HF data profiles for significant improvement in guarantee of delivery of email attachments in poor propagation conditions associated with the HF medium.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 5 of 28)

FY 2001 RDT&E, N Budget Item Justification

PROJECT NUMBER: X0798

DATE: FEBRUARY 2000

4 BUDGET ACTIVITY:

PROGRAM ELEMENT TITLE: SEW Architecture/Eng PROGRAM ELEMENT: 0604707N

PROJECT TITLE: OTH TARGETING

- (U) (\$271) Exploit and coordinate subnet relay protocols and multi-frequency band channels to provide greater data throughput in the HF and UHF Line-of-Site RF mediums.
- Based on results of integration testing, develop capability functional description documents which will be used by the programs of record to define system functional requirements that support these capabilities. Develop system interface standards where required. Provided a valid master configuration database in support of the new IT-21 Battle Group configurations.
- Land Based Test Network (LBIN) and Systems Integration Environment. (RLBTS has been expanded to validate Conduct systems integration, interoperability, and Y2K testing using the facilities of the IT-21 technologies prior to shipboard installation. (\$315)
- (\$493) Validate and verify the interoperability of architectures for new capabilities and supporting Serve as technical expert systems to the fleet. Work with the fleet staffs and Naval Doctrine Command to develop policy and doctrine for operations of NVI in support of Network Centric Warfare ideology. in researching the fleet's technical questions and providing information.
- will make input into the SPAWAR advanced technology division to insure critical deficiencies are high priority during investigation of IT-21. Provide connectivity and conduct integration and interoperability (\$416) Ensure joint interoperability of all systems on the NI by enforcing compliance with the Joint The program's systems engineers testing to verify Y2K compliance and provide systems engineering expertise for both IT-21 and MIL-STD Technical Architecture and Y2K. Verify relevance, recommend modifications to, and maintain OTH-T specifications for support of distribution of the COP to maritime forces. The program's systems e
- Conduct integration testing of OTH-T and combat systems (\$214) Ð

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 6 of 28)

FY 2001 RDT&E,N Budget Item Justification

DATE: FEBRUARY 2000

PROJECT NUMBER: X0798
PROJECT TITLE: OTH TARGETING PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng

(U) OTHER PROGRAM FUNDING SUMMARY:

(D)

4

BUDGET ACTIVITY:

FY 2005 451 FY 2004 438 FY 2003 477 FY 2002 460 FY 2000 FY 2001 440 218 FY 1999 PE 0204660N, AGSAG 4B7N

(U) RELATED RDT&E: (SEW) Architecture/Engineering Support program element is related to all Naval C4I related efforts.

(U) ACQUISITION STRATEGY: Not applicable. ບ່

(U) SCHEDULE PROFILE: Not applicable. Ġ.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 7 of 28)

FY 2001 RDT&E,N Program Element/Project Cost Breakdown

BUDGET ACTIVITY:

PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng

PROJECT NUMBER: X0798
PROJECT TITLE: OTH TARGETING

DATE: FEBRUARY 2000

Exhibit R-3 Cost Analysis	alysis (page	ge 2)							Date: Sep	66 d		;
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/4	ACTIVITY RDI	'εΕ, N/4	PROGRAM ELEMENT 0604707N	LEMENT 06	504707N			щх	PROJECT NA X0798	PROJECT NAME AND NUMBER X0798		OTH Targeting
	Contract Method &	Performing Activity &	Total PYs	FY-99	FY-99 Award	FY-00	FY-00 Award	FY-01	FY-01 Award	Cost To	Total	Target Value of
Cost Categories	Type	Location	Cost	Cost	Date	Cost	Date	Cost	Date	Complete	Cost	Contract
Program Management	Various	Various	1319	149	TBD	152	TBD	151	TBD	Cont.	Cont.	Cont.
System Test and Evaluation	Various	Various	3056	592	ТВD	722	TBD	723	твр	Cont.	Cont.	Cont.
Systems Engineering	Various	Various	764	312	твр	234	TBD	234	TBD	Cont.	Cont.	Cont.
Interoperability Requirements	Various	Various	2792	474	твр	483	TBD	1001	TBD	Cont.	Cont.	Cont.
Subtotal T&E			7931	1527		1591		2109		Cont.	Cont.	Cont.
Remarks												
Subtotal Management												
Remarks												
			-	!							 - -	
Total Cost			7931	1527		1591		2109		Cont.	Cont.	Cont.

R-1 Line Item No 80

Project Cost Breakdown (Exhibit R-3, page 8 of 28)

FY 2001 RDT&E, N Budget Item Justification Sheet

FEBRUARY 2000

DATE:

PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng Support

(U) COST: (Dollars in Thousands)

BUDGET ACTIVITY: 4

ESTIMATE ESTIMATE ESTIMATE ESTIMATE ESTIMATE COMPLETE PROGRAM FY 2000 FY 2001 FY 2002 FY 2003 FY 2004 FY 2005 FY 1999 ACTUAL NUMBER TITLE

Cont. Cont. 9,345 9,068 7,200 8,093 8,154 8,545 X2144 SEW Engineering

reconfiguration, as well as reduce costs. SEW Engineering also provides the Navy support in the demonstration and integration of C41 systems developed by the services and by commercial vendors as part of the annual Joint Warrior Interoperability Demonstration (JWID) sponsored by the Joint Chiefs of Staff. Each JWID is designed is a non-acquisition engineering effort defined as the neutralization or destruction of enemy targets and the composite operational capabilities of SEW systems (not the individual component systems) conform to the Naval and the Defense Science Board Summer Study Task Force Report on Information Architecture for the Battlefield, C4ISR architecture as related to the National Defense Strategy and evolving joint visions and direction such as Joint Vision 2010, "Copernicus...C4ISR for the 21st Century," "Forward…From the Sea," C4I for the Warrior, SEW Engineering encompasses efforts to ensure that 1) the necessitated through concepts such as Network Centric Warfare, Integrated Information Base, IT-21, and Naval MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Space and Electronic Warfare (SEW) Engineering off-the-shelf (GOTS/COTS) products to enhance the Navy's operational capability, interoperability, flexible Additionally, JWID demonstrates these technologies for assessment by the warfighters from ongoing service efforts. Service participants benefit from the exposure to the new technologies, the transfer of information processing technologies primarily through integration of government and commercial and are guided by CINC requirements; 2) the systems support emerging fleet requirements as documented and Virtual Intranet; and 3) the SEW systems and systems integration effort involves leading edge technology enhancement of friendly force battle management through integrated employment and exploitation of the to identify joint interoperability deficiencies, and to solicit solutions to these deficiencies from assessments process, and the equipment that is left in place for further use and evaluation. electromagnetic spectrum and the medium of space. commercial industry.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 9 of 28)

FY 2001 RDT&E, N Budget Item Justification

DATE: FEBRUARY 2000

4 PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng

BUDGET ACTIVITY:

PROJECT NUMBER: X2144

PROJECT TITLE: SEW ENGINEERING

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1999 ACCOMPLISHMENTS:

- annual Joint Warrior Interoperability Demonstration (JWID). Plans incorporated the use of enhanced operational capabilities in key CINC priority areas and Joint Mission Area (JMA) Assessment Thrust (U) (\$758) Developed plans for the integration of maturing system developments and military and commercial technologies that support the "Copernicus...C4ISR for the $21^{\rm st}$ Century" concept into the Areas which included high-capacity communications, improved Command and Control Warfare (C2W), integrated landfight architecture, trusted systems/multi-level security, improved sensors/strike planning, common tactical/operational picture, theater air defense/force protection, and combat identification
- FBE "D" primary focus was the development of tactics, (U) (\$384) Remainder of FY1998 Below Threshold Reprogramming (BTR) received in FY 1999 in support of techniques and procedures supporting execution of Theater Air Defense and prevention of incursion by the Maritime Battle Center to support the Fleet Battle Experiment "D" to build continued lessons Completion of FBE "D" was a critical step toward successful preparation for the follow-on experiment, FBE "E". learned from previous Fleet Battle Experiments. enemy Special Operations Forces.
- (\$935) Generated the Copernicus Implementation Guidance, applying a web-based collaborative grid current guidance requires redirection to incorporate emerging warfighter requirements and concepts. approach where programs/projects are synchronized across the claimancy/acquisition community. The The shift from platform-centric warfare to network-centric warfare demands that new approaches are identified, matured, and tested with the warfighters and systems developers. The product was a validated and modeled methodology, based on web technology, whereby a matrix of capabilities are mapped to organizations and products, leading to prioritized and scoped C4ISR work elements for claimancy pursuits.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 10 of 28)

FY 2001 RDT&E, N Budget Item Justification

DATE: FEBRUARY 2000

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng

PROJECT NUMBER: X2144
PROJECT TITLE: SEW ENGINEERING

- reflected in the latest operational architectures. Additionally, supported related C4ISR architecture projects as they supported Theater and Battleforce C4ISR architectures. (U) (\$200) Augmented/updated/maintained the Overarching C4ISR Operational Requirements Documentation. change, technical insertion into systems, or through systems integration efforts, these changes were Strategy and evolving joint visions and direction such as Joint Vision 2010, "Copernicus...C4ISR for As operational requirements changed, either through changes in mission, technological The composite operational capabilities of C4ISR systems (not the individual component systems) were designed so that they conform to the Naval C4ISR architecture as it relates to the National Defense the 21st Century," "Forward...From the Sea", C41 for the Warrior and the Defense Science Board Summer Study Task Force Report on Information Architecture for the Battlefield, and are guided by CINC requirements.
- specifics of warfighter functions to lower levels of detail. From this, SPAWAR developed the "ring charts" for some Battle Groups/Amphibious Ready Groups, generic platform designs, and detailed designs for each platform. Sponsored and/or participated in related IPTs within the claimancy and throughout Commanders in the development of operation and overarching architectures and maintaining documentation achieve the desired operational objectives. Farthermores. The POM C4ISR Systems Architecture Battle Laboratories to verify and validate systems architectures. The POM C4ISR Systems Architecture Battle Laboratories to verify and validate and architecture was updated as appropriate. The decomposition was enhanced. The "As-Is" C4ISR Systems Architecture was updated as appropriate. The decomposition of the overarching POM C4ISR Systems Architecture was accomplished. This involved breaking down the describing the Systems Architectures; and (2) providing system architecture parameters, attributes, develop and validate a Naval C4ISR Architecture based on the multi-tier architecture framework of the Navy Department and DoD, as required; and participated in OSD and joint architectural working and characteristics necessary to ensure that Program Executives and Managers acquire systems that Defined an end-to-end process model to document the C4ISR systems development achieve the desired operational objectives. Participated with the Joint Battle Center and Naval Operational, System, and Technical to support Naval missions in a Joint and Coalition Theater. Architectural development consisted of (1) assisting OPNAV, Navy Doctrine Command, and Fleet Enhanced and refined the C4ISR Planned Systems Design for the POM years. orocess and relationships among the systems development components. groups and panels.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 11 of 28)

FY 2001 RDT&E, N Budget Item Justification

DATE: FEBRUARY 2000

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng

BUDGET ACTIVITY:

PROJECT NUMBER: X2144
PROJECT TITLE: SEW ENGINEERING

- Group (JTADG). Navy inputs to the JTA Version 3.0 were developed in accordance with direction from the Technical Architecture Steering Group (TASG) and the DoD Architecture Coordination Council (ACC). (U) (\$892) Continued support to the Joint Technical Architecture/Standards development/documentation and implementation effort, and published periodic updates. Represented and coordinated Navy inputs into the Joint Technical Architecture developed in conjunction with both internal Naval and external service units and agencies including the and ASD(C3I) Joint Technical Architecture (JTA) Development Guidance (ITSG) document. Coordinated the implementation of JTA standards and protocols throughout the C4ISR systems development community. Provided appropriate design guidance and resulting data inputs into the Naval Architecture Database (NAD). Supported and coordinated NAD tools development Matured the Levels of Information Systems Interoperability (LISI) constructs as Coordinated the JTA standards and protocols with the DON CIO's Information Technology Standards they relate to the JTA. for JTA products.
- Dictionary to reflect additional study inputs; and provided C4ISR inputs to the Maritime Battle Center (MBC) to provide test/experimentation development planning with other Navy and service organizations for the conduct of Naval and Joint experiments including Fleet Warfare Experiments, IT-21, Theater Air dynamic systems model; analyzed the criteria and requirements for the operational system architecture refined data model and schema, the addition of the SMIDB database, the Levels of Information Systems Interoperability Technical Reference Model, an expanded tool set, and documented relationships to (U) (\$1,988) Matured the Naval Architecture Database (NAD) to encompass, establish, and populate the Defense (TAD) Battle Management C4I (BMC4I), etc. Products included expanded reference sets, functional transition; continued population of the data models; updated the Hierarchical Data related databases.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 12 of 28)

FY 2001 RDT&E, N Budget Item Justification

PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng

PROJECT NUMBER: X2144

IG PROJECT TITLE: SEW ENGINEERING

DATE: FEBRUARY 2000

3. (U) FY 2000 PLAN:

BUDGET ACTIVITY:

- and Control Warfare (C2W), integrated landfight architecture, trusted systems/multi-level security, improved sensors/strike planning, common operational picture, collaborative planning, knowledge based systems, smart push-warrior pull data flow, theater air defense/force protection, and combat identification. In conjunction with all services, assess mature technologies and submit recommendation for rapid acquisition of technologies that provide solutions to the warfighter's problems. commercial technologies that support enhanced operational capabilities in key CINC priority areas and Joint Mission Area (JMA) Assessment Thrust Areas into the annual Joint Warrior Interoperability Demonstration (JWID). Integration plans will include high-capacity communications, improved Command (U) (\$2,684) Develop plans for the integration of maturing system developments, military and
- Navy, demands that new approaches are identified, matured, and tested with the warfighters and systems developers. The product will be a validated and modeled methodology, based on web technology, whereby a matrix of capabilities are mapped to organizations and products, leading to prioritized and scoped (U) (\$497) Generate a web-based collaborative grid approach where programs/projects are synchronized across the claimancy/acquisition community. The shift for the afloat part of the Navy, from platform-centric warfare to network-centric warfare, and the Naval Intranet for the land based portion of the C4ISR work elements for claimancy pursuits. •
- (U) (\$1,094) Migrate the Overarching C4ISR Operational Requirements Documentation to a web-based, fully Navy inputs to the C4ISR portion of the JTA Version 3.0 will be developed in accordance with direction throughout the C4ISR systems development community. Provide appropriate design guidance and resulting data inputs into the Naval Architecture Database (NAD). Support and coordinate NAD tools development for JTA products. Support the maturation of the Levels of Information Systems Interoperability (LISI) units and agencies including the ASD(C3I) Joint Technical Architecture (JTA) Development Group (JTADG) requiring such data, can gain access to automated darabases and accompanying tools. Continue support to the C4ISR portion of the Joint Technical Architecture/Standards development/documentation and Joint Technical Architecture developed in conjunction with both internal Naval and external service interactive, collaborative site, where requirements generators, systems developers, and other users implementation effort, and publish periodic updates. Represent and coordinate Navy inputs into the from the Technical Architecture Steering Group (TASG) and the DoD Architecture Coordination Council Coordinate the C4ISR JTA standards and protocols with the DON CIO's Information Technology Standards Guidance (ITSG) document. Coordinate the implementation of JTA standards and protocols constructs as they relate to the JTA.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 13 of 28)

FY 2001 RDT&E, N Budget Item Justification

4

BUDGET ACTIVITY:

PROJECT NUMBER: X2144

FEBRUARY 2000

PROJECT TITLE: SEW ENGINEERING PROGRAM ELEMENT TITLE: SEW Architecture/Eng PROGRAM ELEMENT: 0604707N

develop and validate a Naval C4ISR systems design environment to support Naval missions in a Joint and Coalition Theater. Architectural development will consist of (1) assisting OPNAV, Navy Doctrine Command, and Fleet Commanders in the development of battlegroup-wide and hull specific designs, (2) Sponsor and/or participate in related IPTs within the claimancy and throughout the and panels. Define an end-to-end process model to document the C4ISR systems development process and and (3) providing system architecture parameters, attributes, and characteristics necessary to ensure that Program Executives and Managers acquire systems that achieve the desired operational objectives. Participate with the Joint Battle Center and Naval Battle Laboratories to verify and validate overall systems designs and detailed implementation designs. The decomposition of the overarching POM C4ISR Systems Architecture will be accomplished. This involves breaking down the specifics of warfighter Navy Department and DoD, as required, and participate in OSD and joint architectural working groups maintaining documentation describing the Systems Architectures/shipboard and ashore configurations, Groups/Amphibious Ready Groups, generic platform designs, and detailed designs for each platform. These developed documents, coupled with control measures, will allow configuration management of functions to lower levels of detail. From this, SPAWAR can develop the "ring charts" for Battle Continue to Enhance and refine the C41SR Planned Systems Design for the POM years. relationships among the systems development components. installed designs. (\$945)

composite operational capabilities of C4ISR systems must be designed so that they conform to the Naval C4ISR architecture as it relates to the National Defense Strategy and evolving joint visions and direction such as Joint Vision 2010, "Copernicus...C4ISR for the 21st Century," "Forward...From the Sea", C4I for the Warrior, and the Defense Science Board Summer Study Task Force Report on Information change, either through changes in mission, techological change, technical insertion into systems, or through systems integration efforts, these changes must be reflected in all applicable requirements Additionally, support to related C41SR projects as they define and maintain Theater and Architecture for the Battlefield, and are guided by CINC requirements. As operational requirements (U) (\$640) Augment/update/maintain the Overarching C4ISR Operational Requirements documentation. Battleforce C4ISR architectures must be maintained.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 14 of 28)

FY 2001 RDT&E, N Budget Item Justification

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng PF

BUDGET ACTIVITY:

PROJECT NUMBER: X2144
PROJECT TITLE: SEW ENGINEERING

DATE: FEBRUARY 2000

Defense (TAD) Battle Management C4I (BMC4I), etc. Products include expanded reference sets, a refined data model and schema, the addition of the SMIDB database, the Levels of Information Systems (U) (\$2,685) Develop the Navy's common repository for architectural and interoperability support, data integration, and systems design data and information. As part of the repository, the Naval Architecture Database (NAD) will encompass establishment and population of the dynamic systems model, conduct of Naval and Joint experiments including Fleet Warfare Experiments, JWID, IT-21, Theater Air provide test/experimentation development planning with other Navy and service organizations for the Interoperability Technical Reference Model, an expanded tool set, and documented relationships to Dictionary to reflect Joint study inputs, and provision for C4ISR implementation of the Maritime Battle Center (MBC). This effort includes senior test engineers and laboratory coordinators to transition, continuation of the population of the data models, update of the Hierarchical Data analysis of the criteria and requirements for the operational system architecture functional related databases.

4. (U) FY 2001 PLAN:

Demonstration (JWID). Integration plans will include high-capacity communications, improved Command and Control Warfare (C2W), integrated landfight architecture, trusted systems/multi-level security, improved sensors/strike planning, common operational picture, collaborative planning, knowledge based systems, smart push-warrior pull data flow, theater air defense/force protection, and combat commercial technologies that support enhanced operational capabilities in key CINC priority areas and Joint Mission Area (JMA) Assessment Thrust Areas into the annual Joint Warrior Interoperability Technologies that will benefit operational forces with their immediate employment at sea or in the identification. Field demonstrated and assessed Joint Chief of Staff mandated Golden Nuggets (U) (\$2,613) Develop plans for the integration of maturing system developments, military and

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 15 of 28)

FY 2001 RDT&E,N Budget Item Justification

BUDGET ACTIVITY:

PROJECT TITLE: SEW ENGINEERING PROJECT NUMBER: X2144 PROGRAM ELEMENT TITLE: SEW Architecture/Eng PROGRAM ELEMENT: 0604707N

DATE: FEBRUARY 2000

methodology, based on web technology, whereby a matrix of capabilities are mapped to organizations and products, leading to prioritized and scoped C4ISR work elements for claimancy pursuits. This web site will contain the results of technology insertion experiments and "lessons learned" from those trials, so that successes can be applied to similar systems enhancement attempts. Included will be software Intranet for the land based portion of the Navy, demands that new approaches are identified, matured, and tested with the warfighters and systems developers. The product will be a validated and modeled programs/projects are synchronized across the claimancy/acquisition community. The shift for the afloat part of the Navy, from platform-centric warfare to network-centric warfare, and the Naval (\$477) Continue development and of the web-based collaborative grid approach where reuse experiments, hardware applications, and networking trials. •

Architecture (JTA) Development Group (JTADG). Navy inputs to the C4ISR portion of the JTA Version 3.0 will be developed in accordance with direction from the Technical Architecture Steering Group (TASG) and the DoD Architecture Coordination Council (ACC). Coordinate the C4ISR JTA standards and protocols Support the maturation of the (U) (\$964) Continue the migration of the Overarching C4ISR Operational Requirements Documentation to web-based, fully interactive, collaborative site, where requirements generators, systems developers, and other users requiring such data, can gain access to automated databases and accompanying tools. Continue support to the C4ISR portion of the Joint Technical Architecture/Standards implementation of JTA standards and protocols throughout the C4ISR systems development community. Provide appropriate design guidance and resulting data inputs into the Naval Architecture Database Represent and internal Naval and external service units and agencies including the and ASD(C3I) Joint Technical development/documentation and implementation effort, and publish periodic updates. Represent ar coordinate Navy inputs into the Joint Technical Architecture developed in conjunction with both Coordinate the (NAD). Support and coordinate NAD tools development for JTA products. Support the maturat Levels of Information Systems Interoperability (LISI) constructs as they relate to the JTA. with the DON CIO's Information Technology Standards Guidance (ITSG) document.

develop and validate a Naval C4ISR systems design environment to support Naval missions in a Joint and and (3) providing system architecture parameters, attributes, and characteristics necessary to ensure Participate with the Joint Battle Center and Naval Battle Laboratories to verify and validate overall that Program Executives and Managers acquire systems that achieve the desired operational objectives. maintaining documentation describing the Systems Architectures/shipboard and ashore configurations; Coalition Theater. Architectural development will consist of (1) assisting OPNAV, Navy Doctrine Command, and Fleet Commanders in the development of battlegroup-wide and hull specific designs, Continue to Enhance and refine the C41SR Planned Systems Design for the POM years. (L) (\$907)

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 16 of 28)

FY 2001 RDT&E, N Budget Item Justification

4

BUDGET ACTIVITY:

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng PROJECT

PROJECT NUMBER: X2144
PROJECT TITLE: SEW ENGINEERING

DATE: FEBRUARY 2000

installed designs. Sponsor and/or participate in related IPTs within the claimancy and throughout the Navy Department and DoD, as required and participate in OSD and joint architectural working groups and The decomposition of the overarching POM C4ISR Systems Architecture will be accomplished. This involves breaking down the specifics of warfighter functions to lower levels of detail. From this, SPAWAR can develop the "ring charts" for Battle Define an end-to-end process model to document the C4ISR systems development process and Groups/Amphibious Ready Groups, generic platform designs, and detailed designs for each platform. These developed documents, coupled with control measures, will allow configuration management of relationships among the systems development components. systems designs and detailed implementation designs.

composite operational capabilities of C4ISR systems must be designed so that they conform to the Naval Sea", C4I for the Warrior and the Defense Science Board Summer Study Task Force Report on Information change, either through changes in mission, technological change, technical insertion into systems, c through systems integration efforts, these changes must be reflected in all applicable requirements documents. Additionally, support to related C4ISR projects as they define and maintain Theater and Architecture for the Battlefield, and are guided by CINC requirements. As operational requirements C41SR architecture as it relates to the National Defense Strategy and evolving joint visions and direction, such as Joint Vision 2010, "Copernicus...C41SR for the 21st Century," "Forward...From the (U) (\$615) Augment/update/maintain the Overarching C4ISR Operational Requirements documentation. Battleforce C4ISR architectures must be maintained.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 17 of 28)

FY 2001 RDT&E,N Budget Item Justification

A LOW GERTAINS HOUT OUT

DATE: FEBRUARY 2000

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng

PROJECT NUMBER: X2144
PROJECT TITLE: SEW ENGINEERING

- support, data integration, and systems design data and information. As part of the repository, the Naval Architecture Database (NAD) will encompass; establishment and population of the dynamic systems conduct of Naval and Joint experiments including Fleet Warfare Experiments, JWID, IT-21, Theater Air refined data model and schema, the addition of the SMIDB database, the Levels of Information Systems (U) (\$2,578) Enhance and develop the Navy's common repository for architectural and interoperability transition, continuation of the population of the data models and update the Hierarchical Data Dictionary to reflect Joint study inputs, and provision for C4ISR implementation of the Maritime Battle Center (MBC). This effort includes senior test engineers and laboratory coordinators to provide test/experimentation development planning with other Navy and service organizations for the model, analysis of the criteria and requirements for the operational system architecture functional Interoperability Technical Reference Model, an expanded tool set, and documented relationships to Defense (TAD) Battle Management C4I (BMC4I), etc. Products include; expanded reference sets, a related databases. Support additional user bases from the CINC Interoperability Program Office (CIPO), other Systems Commands, and Fleet users by providing comprehensive and authoritative databases for planning and programmatic information.
- B. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.
- C. (U) ACQUISITION STRATEGY: Not applicable.
- D. (U) SCHEDULE PROFILE: Not applicable.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 18 of 28)

FY 2001 RDT&E,N Program Element/Project Cost Breakdown

4

BUDGET ACTIVITY:

PROJECT NUMBER: X2144
PROJECT TITLE: SEW ENGINEERING

DATE: FEBRUARY 2000

PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng

Target Value of Contract Date: SEP 1999 PROJECT NAME AND NUMBER SEW Engineering X2144 Total Cost Cost To Complete FY-01 Award Date FY-01 Cost FY-00 Award Date FY-00 Cost FY-99 Award Date PROGRAM ELEMENT 0604707N FY-99 Cost Total PYS Cost Performing Activity & Location Exhibit R-3 Cost Analysis (page 1) APPROPRIATION/BUDGET ACTIVITY RDIRE, N Contract Method & Type Subtotal Product Cost Categories Development Remarks:

SEW/C4I Technology	Various	Various	4554							0	4554	4554
Integration												
Systems A&E and	Various	Various	10101							0	10101	10101
Validation												
Systems Validation	Various	Various	1034							0	1034	1034
Systems Engineering			1850							0	1850	1850
Operational	Various	Various		200	TBD	1094	TBD	964	TBD	Cont.	Cont.	Cont.
Requirements												
Systems Design	Various	Various		2816	TBD	945	TBD	907	TBD	Cont.	Cont.	Cont.
Technical Standards	Various	Various		892	TBD	640	TBD	615	TBD	Cont.	Cont.	Cont.
Information	Various	Various		1988	TBD	2685	TBD	2578	TBD	Cont.	Cont.	Cont.
Repository/Naval												
Architecture Database												
C4ISR Capabilities	Various	Various		935	TBD	497	TBD	477	TBD	Cont.	Cont.	Cont.
Subtotal Support	Various	Various	17539	6831		5861		5541	TBD	Cont.	Cont.	Cont.
Remarks			t									

R-1 Line Item No 80

Budget Item Justification (Exhibit R-3, page 19 of 28)

FY 2001 RDT&E,N Program Element/Project Cost Breakdown

4 BUDGET ACTIVITY:

PROJECT NUMBER: X2144
PROJECT TITLE: SEW ENGINEERING

DATE: FEBRUARY 2000

PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng

Exhibit R-3 Cost Analysis	nalvsis (page 2)							μΩ	Date: SEP	SEP 1999		
ATION	ACTIVITY RDT&E,N		PROGRAM	ELEMENT	PROGRAM ELEMENT 0604707N			PP.	PROJECT NAM	PROJECT NAME AND NUMBER SEW Engineering X2144	ER SEW En	gineering
net Cated ted	Contract Method & Type	Performing Activity & Location	Total PYS	FY-	FY-99 Award Date	FY-00	FY-00 Award Date	FY-01 Cost	FY-01 Award Date	Cost To Complete	Total	Target Value of Contract
cost caregorites				Cost	2272	3 6	22 1	2000	33 44	7	1000	1
SEW Engr/JWID	Various	Various	3815	384	N/A	2684	TRD	2613	TRD	conc.	cont.	cont.
Subtotal T&E	Various	Various	3815	1142	N/A	2684	TBD	2613	TBD	Cont.	Cont.	Cont.
Remarks												
Gubtotal												
Management												
Remarks												
Total Cost			21354	7973		8545		8154		Cont	Cont.	Cont.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-3, page 20 of 28)

FY 2001 RDT&E,N Budget Item Justification

DATE: FEBRUARY 2000

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng

(U) COST: (Dollars in Thousands)

PROJECT

NUMBER

FY 2005 FY 2004 FY 2003 FY 2002 FY 2001 FY 2000 FY 1999

TITLE

COMPLETE PROGRAM ESTIMATE ESTIMATE ESTIMATE ESTIMATE ESTIMATE ACTUAL

Cont.

23,819

23,855

23,906

23,897

23,837

R2357 Maritime Battle 11,140 23,784 Center MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The mission of the Maritime Battle Center (MBC) is Corps Warfighting Lab (MCWL), the Joint Battle Center/Federated Battle Lab, and technologists in industry and Laboratories (SBBL), Science & Technology (S&T) initiatives and other initiatives that originate with the operating forces. The MBC will support the early and sustained involvement of Joint Warfighters in refining the technology to meet the tactics, techniques, and procedures needed for 2010-2020 Littoral Battlespace. The academia as appropriate. The MBC is essential to the evolution of combat capabilities since it is the engine platform, weapons, weapon systems and Information Technologies (IT), Information System (IS) and Information experimentation planning and execution, technology transition/acquisition support, systems engineering, and MBC will have multiple roles since it is a crosscutting organization involved in several facets of concept, environment is a network centric environment that links the existing "core" Naval facilities to the Marine preliminary sub-scale experiments and technological demonstrations focused on the advanced engineering and The process takes concepts developed by the Strategic Management (IM) systems development and integration. These include collaborative planning, operational to execute the Naval Warfare Innovation Process. The process takes concepts developed by the Strate Studies Group and approved by the Chief of Naval Operations into Fleet Battle Experiments; conducts for validating the new network centric warfare techniques in conjunction with the Sea Based Battle operational system development of systems related to all conflict levels of Littoral Battlespace. integration, technology assimilation and operational demonstrations.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 21 of 28)

FY 2001 RDT&E,N Budget Item Justification

DATE: FEBRUARY 2000

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng

4

BUDGET ACTIVITY:

PROJECT NUMBER: R2357
PROJECT TITLE: MARITIME BATTLE
CENTER

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1999 ACCOMPLISHMENTS

- (U) (\$1,261) FBE Analysis and Core Support: The management and administration of MBC activities included oversight of the experimental planning phase, the execution and collection phases, the analysis phase, and the output decision phase. This entailed the integration of many preliminary experiments and technology demonstrations coupled with the inputs of experienced military leaders, current warfighting CINCs, and The management and administration of MBC activities included technologists from industry and academia.
- Commanders during the Fleet Battle Experiment (FBE) or Limited Objective Experiment (LOE). The technology utilized preliminary engineering experimentation to determine its compatibility and compliance with the Global Command and Control System (GCCS) architectures, IT 21 architectures, and the identification of high identification of technologies with "production" potential. These technologies include commercially developed technologies in collaborative planning, interactive sharing, the correlation of decision datareducing "decision time, and the exploration of dynamically managed circuits operating in sea, ground, performance and interoperability issues. The objective of these preliminary experiments was to bring (U) (\$973) Enabled Technical Development: Prior to any technology transition to the Numbered Fleet information superiority to Fleet operations while achieving a level of critical mass in the early and/or aerospace domains.
- leads for FBEs and LOEs. The Fleet Commander in the AOR where the experiment was held lead the F|BE series and designated their flagship as Sea Based Battle Laboratories (SBBL) that worked with the MBC Director in the conduct of the FBE. This enabled the Fleet to directly participate in the development of future Navy (U) (\$7,414) FBE Direct Experimentation: The Numbered Fleet Commanders were designated experimentation concepts and capabilities and provided the Fleet an opportunity to provide immediate Feedback to the technologist and concept developer.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 22 of 28)

FY 2001 RDT&E, N Budget Item Justification

PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng

4

BUDGET ACTIVITY:

PROJECT NUMBER: R2357 PROJECT TITLE: MARITIME BATTLE CENTER

DATE: FEBRUARY 2000

Advanced Concept Technology Demonstrations (ACTDs), Joint Warrior Interoperability Demonstration (JWIDs), and Joint Battle Center (JBC) activities and determined the most expeditious paths to transition such concepts into actual and sustainable Naval warfighting capability. As innovative technologies emerged from (U) (\$1,492) Technical Evaluation: MBC planed and participated in the planning of other services and joint Its core competency was brought into operation for testing and analysis purposes. Navy laboratory support from all claimancies tasked dependent on the requirements. Knowledge of laboratory capabilities and projected needs of such laboratories was inherent in this support. Joint exercise support supplied by maritime forces was also recommendations for future related activities. The technical operations also evaluated the results of the commercial section, the technical operations element devised insertion strategies for prototypes. existing resources, the components used to provide the required set of capabilities was generated and fleet operations, exercise designs, costing, equipping and exercise analysis and overall evaluations commands of exercises and tests that involved the Navy experimentation process. coordinated using this organizational function.

2. (U) FY 2000 PLAN:

- includes oversight of the experimental planning phase, the execution and collection phases, the analysis phase, and the output decision phase. This entails the integration of many preliminary experiments and technology demonstrations coupled with the inputs of experienced military leaders, current warfighting (U) (\$4,887) FBE Analysis and Core Support: The management and administration of MBC activities CINCs, and technologists from industry and academia.
- developed technologies in collaborative planning, interactive sharing, the correlation of decision data-(U) (\$4,082) Enabling Technical Development: Prior to any technology transition to the Numbered Fleet Commanders during a Fleet Battle Experiment (FBE) or Limited Objective Experiment (LOE). The technology bring information superiority to Fleet operations while achieving a level of critical mass in the early Global Command and Control System (GCCS) architectures, IT 21 architectures, and the identification of reducing "decision time, and the exploration of dynamically managed circuits operating in sea, ground, needs preliminary engineering experimentation to determine its compatibility and compliance with the high performance and interoperability issues. The objectives of these preliminary experiments is to identification of technologies with "production" potential. These technologies include commercially and/or aerospace domains.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 23 of 28)

FY 2001 RDT&E, N Budget Item Justification

4

BUDGET ACTIVITY:

PROJECT NUMBER: R2357

PROGRAM ELEMENT TITLE: SEW Architecture/Eng PROGRAM ELEMENT: 0604707N

PROJECT TITLE: MARITIME BATTLE CENTER

DATE: FEBRUARY 2000

- The Fleet Commander in the AOR where the experiment is held will lead the ${ t F} \mid { t BE}$ series and designate their flagship as Sea Based Battle Laboratories (SBBL) that will work with the MBC (\$13,439) FBE Direct Experimentation: The Numbered Fleet Commanders are designated experimentation Director in the conduct of the FBE. This enables the Fleet to directly participate in the development of future Navy concepts and capabilities and provides the Fleet an opportunity to provide immediate feedback to the technologist and concept developer. leads for FBEs and LOEs.
- will be generated and brought into operation for testing and analysis purposes. Navy laboratory support from all claimancies will be tasked dependent on the requirements. Knowledge of laboratory capabilities and Its core competency will be fleet operations, exercise designs, costing, equipping and exercise analysis and overall evaluations with recommendations for future related activities. The technical operations will also evaluate the results of Advanced Concept Technology Demonstrations (ACTDs), Joint Warrior Interoperability Demonstration (JWIDs), and Joint Battle Center (JBC) activities and determine the most expeditious paths to transition such projected needs of such laboratories will be inherent in this support. Joint exercise support supplied by (U) (\$1,376) Technical Evaluation: MBC will plan and participate in planning by other services and joint emerge from the commercial section, the technical operations element will devise insertion strategies for concepts into actual and sustainable Naval warfighting capability. As promising innovative technologies prototypes. Using existing resources, the components needed to provide the required set of capabilities commands of exercises and tests that involve the Navy experimentation process. maritime forces will also be coordinated using this organizational function.
- (U) FY 2001 PLAN: . ش
- includes oversight of the experimental planning phase, the execution and collection phases, the analysis phase, and the output decision phase. This entails the integration of many preliminary experiments and technology demonstrations coupled with the inputs of experienced military leaders, current warfighting (U) (\$4,830) FBE Analysis and Core Support: The management and administration of MBC activities CINCs, and technologists from industry and academia.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 24 of 28)

FY 2001 RDT&E, N Budget Item Justification

DATE: FEBRUARY 2000

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng PR

4

BUDGET ACTIVITY:

PROJECT NUMBER: R2357
PROJECT TITLE: MARITIME BATTLE
CENTER

- identification of technologies with "production" potential. These technologies include commercially developed technologies in collaborative planning, interactive sharing, the correlation of decision datareducing "decision time, and the exploration of dynamically managed circuits operating in sea, ground, Commanders during a Fleet Battle Experiment (FBE) or Limited Objective Experiment (LOE). The technology bring information superiority to Fleet operations while achieving a level of critical mass in the early Global Command and Control System (GCCS) architectures, IT 21 architectures, and the identification of high performance and interoperability issues. The objectives of these preliminary experiments is to (U) (\$3,229) Enabling Technical Development: Prior to any technology transition to the Numbered Fleet needs preliminary engineering experimentation to determine its compatibility and compliance with the and/or aerospace domains.
- The Fleet Commander in the AOR where the experiment is held will lead the F|BE series and designate their flagship as Sea Based Battle Laboratories (SBBL) that will work with the MBC Director in the conduct of the FBE. This enables the Fleet to directly participate in the development (U) (\$14,435) FBE Direct Experimentation: The Numbered Fleet Commanders are designated experimentation of future Navy concepts and capabilities and provides the Fleet an opportunity to provide immediate feedback to the technologist and concept developer. leads for FBEs and LOEs.
- will be generated and brought into operation for testing and analysis purposes. Navy laboratory support from all claimancies will be tasked dependent on the requirements. Knowledge of laboratory capabilities and commands of exercises and tests that involve the Navy experimentation process. Its core competency will be fleet operations, exercise designs, costing, equipping and exercise analysis and overall evaluations with recommendations for future related activities. The technical operations will also evaluate the results of projected needs of such laboratories will be inherent in this support. Joint exercise support supplied by Advanced Concept Technology Demonstrations (ACTDs), Joint Warrior Interoperability Demonstration (JWIDs), emerge from the commercial section, the technical operations element will devise insertion strategies for (U) (\$1,343) Technical Evaluation: MBC will plan and participate in planning by other services and joint concepts into actual and sustainable Naval warfighting capability. As promising innovative technologies Using existing resources, the components needed to provide the required set of capabilities and Joint Battle Center (JBC) activities and determine the most expeditious paths to transition such maritime forces will also be coordinated using this organizational function. prototypes.

R-1 Line Item No 80

Budget Item Justification (Exhibit R-2, page 25 of 28)

FY 2001 RDT&E,N Budget Item Justification

4

BUDGET ACTIVITY:

PROGRAM ELEMENT: 0604707N PROGRAM ELEMENT TITLE: SEW Architecture/Eng

DATE: FEBRUARY 2000

PROJECT NUMBER: R2357
PROJECT TITLE: MARITIME BATTLE CENTER

- B. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.
- C. (U) ACQUISITION STRATEGY: Not applicable.
- D. (U) SCHEDULE PROFILE: Not applicable.

R-1 Line Item No 80

UNCLASSIFIED

Budget Item Justification (Exhibit R-2, page 26 of 28)

FY 2001 RDT&E,N Program Element/Project Cost Breakdown

BUDGET ACTIVITY:

4

DATE: FEBRUARY 2000

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng

PROJECT NUMBER: R2357
PROJECT TITLE: MARITIME BATTLE
CENTER

Cost Ana/BUDGET A	Exhibit R-3 Cost Analysis (page 1 APPROPRIATION/BUDGET ACTIVITY RDT&E.N		ROGRAM E	PROGRAM ELEMENT 0604707N	NC 20 2 N				Date: SEP 1999	NE AND MERCE	TO WASTER	7.44.6
	111111111111111111111111111111111111111		a mengon	O T NIGHT	N/ 0 / #00				PROJECT NA Center R2	PROJECT NAME AND NUMBER MARITIME BATTLE Center R2357	ER Mariti	me Battle
	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY-99 Cost	FY-99 Award Date	FY-00 Cost	FY-00 Award Date	FY-01 Cost	FY-01 Award Date	Cost To Complete	Total	Target Value of Contract
										7		
Product												
					•							
Change												
4												

R-1 Line Item No 80

Budget Item Justification (Exhibit R-3, page 27 of 28)

FY 2001 RDT&E, N Program Element/Project Cost Breakdown

BUDGET ACTIVITY:

PROGRAM ELEMENT: 0604707N
PROGRAM ELEMENT TITLE: SEW Architecture/Eng

PROJECT NUMBER: R2357
PROJECT TITLE: MARITIME BATTLE
CENTER

DATE: FEBRUARY 2000

Exhibit R-3 Cost Analysis	lysis (page 2)							Dat	Date: SEP 1999	1999		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N	CTIVITY RDT&E, N			PROGRAM ELEMENT 0604707N	0604707N			PRC	OJECT NAM	PROJECT NAME AND NUMBER Maritime Battle Center R2357	R Maritim	e Battle
	Contract Method & Type	Performing Activity &	Total PYS	FY-99	FY-99 Award	FY-00	FY-00 Award	FY-01	FY-01 Award	Cost To	Total	Target Value of
Cost Categories	37	Location		Cost	Date	Cost	Date	Cost	Date	Complete	Cost	Contract
System Test and Evaluation	Various	Various	2551	9879		18897		19061		CONT	CONT	CONT
Subtotal T&E			2551	9879		18897		19007		CONT	CONT	CONT
Remarks												
Program Management	Various	Various	280	1261		4887		4830		CONT	CONT	CONT
Subtotal Management			280	1261		4887		4830		TNOD	CONT	CONT
Remarks												
Total Cost			2831	11140		23784		23837		CONT	CONT	CONT

R-1 Line Item No 80

Budget Item Justification (Exhibit R-3, page 28 of 28)